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No. 105

WEST COAST OF AFRICA

FROM

CAPE SPARTEL TO CAPE AGULHAS

INCLUDING THE

ISLANDS IN THE BIGHT OF BIAFRA, ASCENSION,
ST. HELENA, TRISTAN DA CUNHA,
AND GOUGH ISLANDS

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SECOND EDITION.

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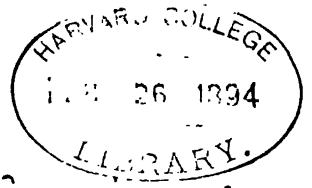

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PREFACE.

These directions originally appeared in three parts as follows:

Vol. I, H. O. No. 46.—The West coast of Africa, from cape Spartel to Sierra Leone, translated from the French of MM. Le Gras and Vallon, by Lieut. Commander Henry H. Gorringe, U. S. Navy.

Vol. II, H. O. No. 47.—The West coast of Africa from Sierra Leone to cape Lopez, translated from the French of MM. De Kerhallet and Le Gras, by Lieut. Leonard Chenery, U. S. Navy.

Vol. III, H. O. No. 48.—The West coast of Africa, from cape Lopez to the cape of Good Hope. The islands in the bight of Biafra, and Ascension and St. Helena islands, translated and compiled by Lieut. Commander J. R. Bartlett, U. S. Navy, from the French of MM. De Kerhallet and Le Gras, with additions from the English "African Pilot" of 1875.

The present work has been compiled from the above sources by R. C. Ray, U. S. Navy, with numerous additions and corrections from the following:

Africa Pilot, Part I, Edition of 1890 (British Admiralty).

Africa Pilot, Part II, Edition of 1893 (British Admiralty).

Africa Pilot, Part III, Edition of 1889 (British Admiralty).

Instructions Nautiques sur La Cote Occidentale D'Afrique de Sierra Leone au cap Lopez (French Hydrographic Office).

Hydrographic Office Archives.

Hydrographic Office, British Admiralty, and French charts.

Consular Reports—State Department.

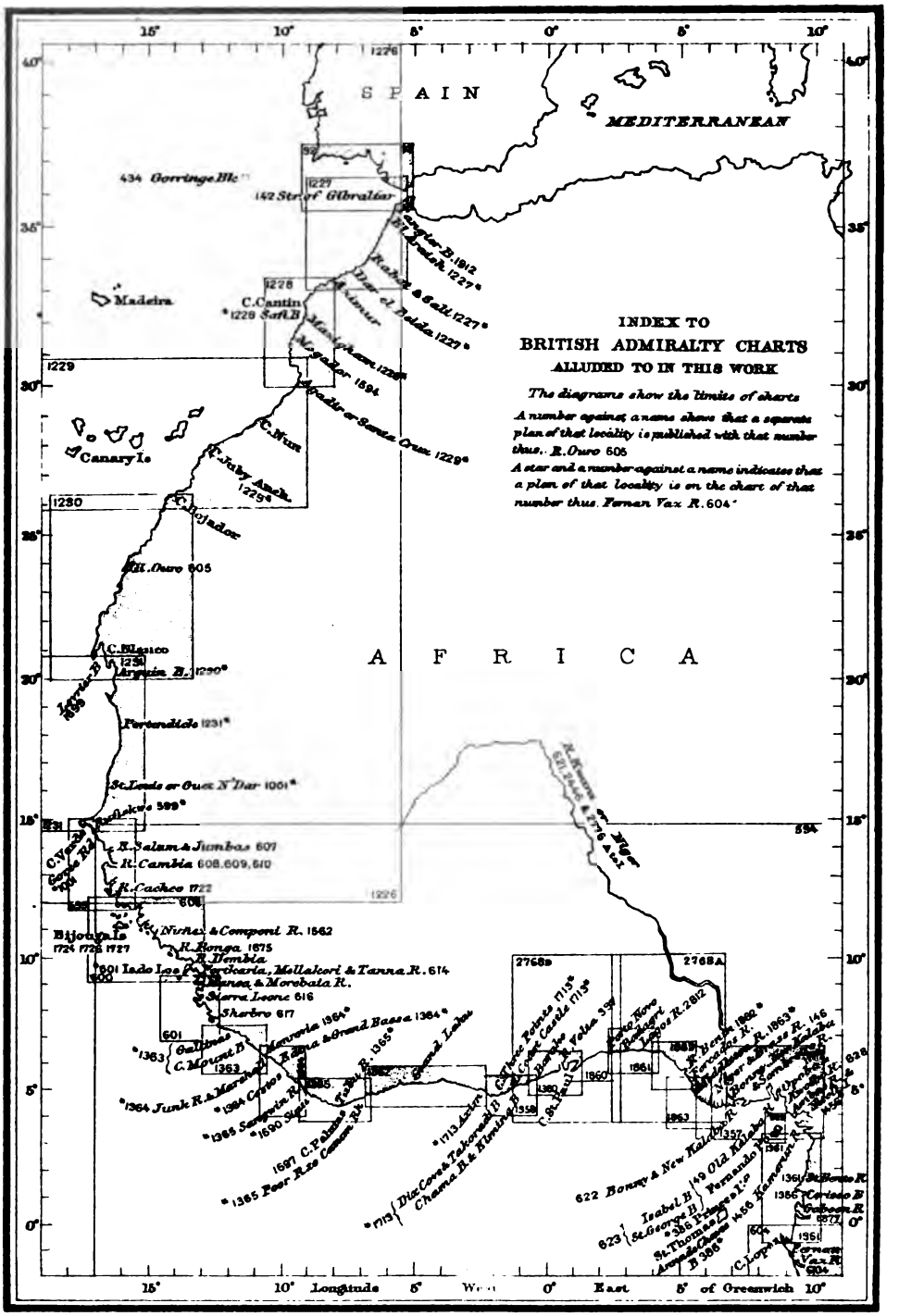
Reports from officers cruising on board United States vessels of war.

C. D. SIGSBEE,
Commander, U. S. Navy,
Hydrographer.

U. S. HYDROGRAPHIC OFFICE,
Washington, D. C., October, 1893.

NOTE.

The bearings, courses, and trend of the land are true; but for convenience the corresponding magnetic bearings to the nearest degree, follow in brackets. [Variation, 1893.] The directions of the winds, the points from which they blow; of currents, the points toward which they set. Distances are expressed in nautical miles. Soundings, unless otherwise stated, are reduced to mean low water.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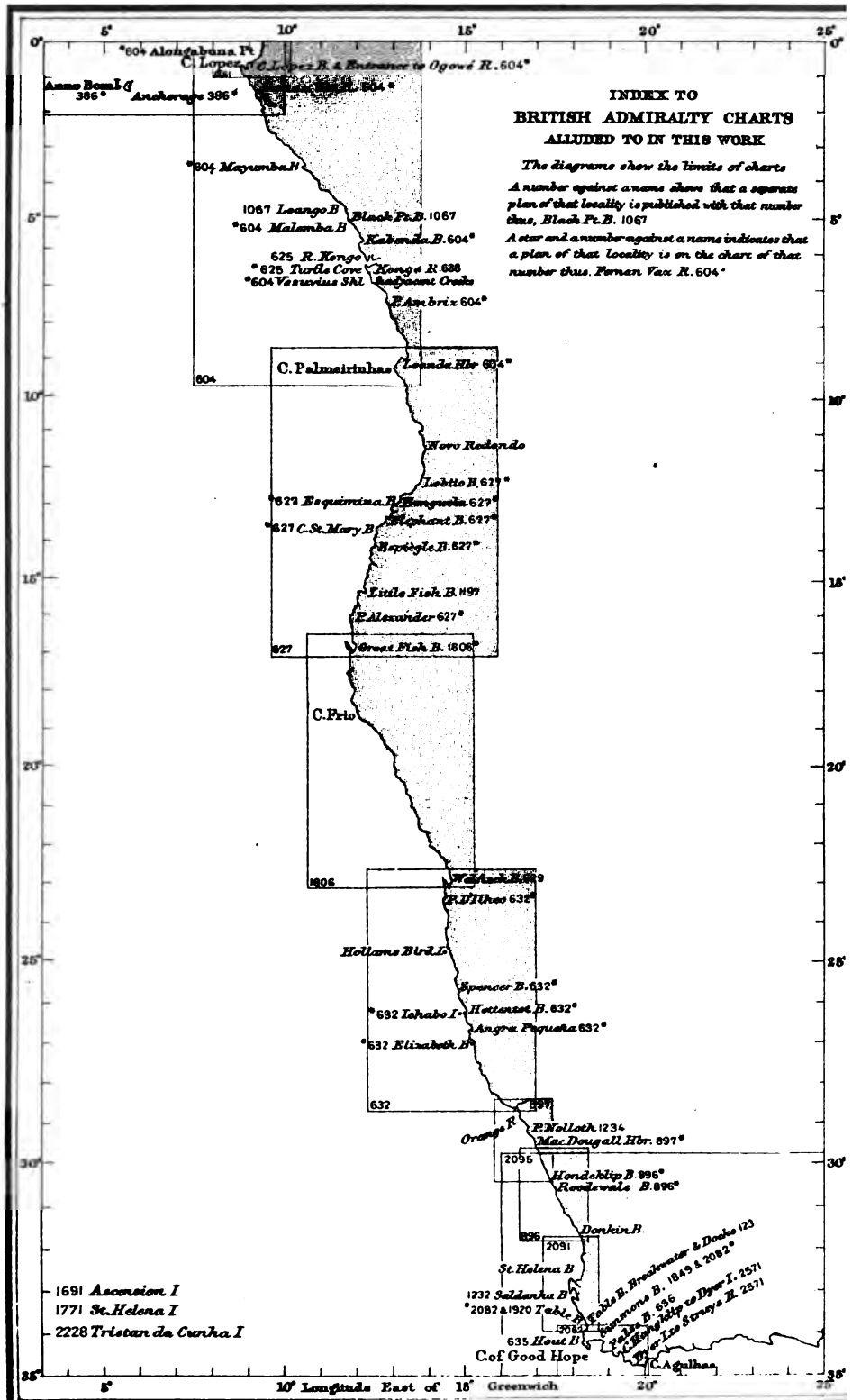
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5°
10°
15°
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35°
10° Longitude East of 15° Greenwich

CHAPTER I.

WEST COAST OF AFRICA.

General Observations, Seasons, Winds, Currents, Tides, and Soundings.

The coast between Tangier and Wadi Shibika is in the Kingdom of Marocco. The principal ports, none of which can be called harbors, are Tangier, El Araish, Rabat, Casa Blanca, Mazighan, Safi, and Mogador.

Sardines are abundant on this coast; the fishing is generally prosecuted from April to September, but, weather permitting, they are caught all the year. The true sardine is said not to be found south of the Ouro river.

The coast of Sahara extends from the Wadi Shibika to the Senegal river, and this comprises the west limit of the Sahara desert. The soil is pure sand unmixed with any other substance. This vast plateau, the surface of which is leveled by the sands of the desert, terminates sometimes in cliffs, at others in gradual slopes; the former are composed of layers of different shades of light-colored sand, the under layers being thinner than the others and of reddish tint. As far as the parallel of 23° N. the soil is nearly always covered with a dark substance which has some hardness. The encroachments of the sea have caused enormous blocks of this substance to fall to the foot of the cliffs; they appear like immense rocks, and the sea breaks against them with great violence, but after a while they are dissolved by the water. There is not a trace of rock or granite on the whole of this coast as far as cape Verde.

Spanish protectorate.—The portion of the coast of the Sahara between cape Bojador and cape Blanco is under the protectorate of Spain. Between cape Blanco and cape Verde the coast is formed of either sand-downs or sandy beaches.

It is reported that the true cod is found on banks off this coast, though inferior in size and flavor to the cod of Newfoundland and the North sea. Spanish fisherman from the Canary islands work the fisheries from the latitude of those islands to South Cape Blanco, for aslimsah (*sciœna aquila*), which weigh from 30 pounds to 80 pounds each; also for tunny and other large and valuable fish. The Spaniards have established fishing stations along the portion of this coast which is under their protection.

French possessions.—On one of the islands in the entrance of Senegal river, about 80 miles north of cape Verde, is the French settlement of St. Louis. For protecting the communication with the Niger river the French have a flotilla on the Senegal river and one on the Niger. Between the Senegal and Niger there are five military stations; and in 1886 a railway

was laid from Medine, on the first cataract, to Bafula-Vé, a distance of 30 miles, which it is proposed to extend to Bamaku on the Niger.

The forts on the upper Senegal, and between it and the Niger, are built of stone and iron. They are garrisoned chiefly by natives, officered by Europeans.

The district in Senegambia acknowledging the sovereignty of France is estimated at 97,000 square miles, and the inhabitants to number upwards of 1,000,000.

The French exercise a protectorate over Kasamanze river and the coast between Tristao island and the northern boundary of Sierra Leone.

In this district are Cobo and Kabilai, between latitudes 9° 30′ N. and 10° N., or immediately north of Isles de Los, and commanding the mouth of the Braméya river, which discharges its waters into Sangaria bay.

The population of these territories is estimated at 30,000 or 40,000.

Cobo is a flat country of about 48 square miles in extent; oil palm trees are very abundant, appearing like a palm forest from the coast. The men are armed with muskets and swords, and are well clothed, giving the idea of their being rich and warlike. Tabuia, on the coast, is the capital.

Kabilai is a mountainous district containing about 120 square miles. The king resides at Jatia, on the river of the same name. The people are Mohammedans, good-natured, and not indolent.

France has also, on the ivory coast, in the Costa river, the trading post of Grand Bassam, and 19 miles further east, Assini; while, on the slave coast, Kotonou and Porto Novo are under the French protectorate.

British possessions.—To the southward of cape Verde are the British possessions of the Gambia; Sierra Leone between about latitude 9° N. and the right bank of the Manna river in latitude 6° 55′ N.; the gold coast; the colony of Lagos; and the Niger protectorate.

The Colony of the Gambia, on Gambia river, consists of the islands of St. Mary, British Combo, Albreda, the Ceded Mile, and McCarthy island. Since 1866 it has been a portion of the government of the West Africa settlement. The colony is bounded on the north by a line from the mouth of Jinnak creek, in 13° 36′ N. latitude, and on the south by a line from the mouth of San Pedro river, in 13° 10′ N. latitude; and extends to Yarbutenda on the Gambia, including that place, and territory never less than 5.4 miles on either side of the river.

The climate is unhealthy from June to November, the prevailing diseases being malarial fevers, chiefly intermittent.

Sierra Leone is the most important of the British possessions on this coast, with a coast line of over 180 miles. The line of demarkation of the colony on the north, after dividing the basin of the Mellakori river from that of Great Skarcies river, approaches the 10th degree of north latitude and extends to 10° 40′ W. longitude. Manna river is the southern

boundary. The isles de Los are also included. The population is made up of many different races, including a large number of Mohammedan negroes.

The climate is unhealthy, especially for Europeans, and is the cause of periodical epidemics. The wet season from May to November is the most sickly. The beginning and ending of the season being the worst. The mean temperature is 82° in the shade. The rainfall in Freetown has averaged over 135 inches a year.

The Gold Coast colony is comprised between a straight line from the seacoast at about ½ mile to the west of Newtown to Tando lagoon, then along the left bank of that lagoon, of Ehi lagoon and Tano river as far as Nugua, and then in accordance with various treaties, to the 9th degree of north latitude; and Afloa in 1° 15′ E. longitude to the east.

The colony and protectorate have a population of 1,126,000. It was formerly held by the Dutch and British, but in 1872 all the Dutch forts and settlements were transferred to Great Britain, when the Royal African Company was formed. In 1821 the settlement was transferred to the Crown, and placed under the Government of Sierra Leone, from which it was separated in 1874 as the Gold Coast Colony.

The chief forts and settlements are Cape Coast Castle, Elmina, Accra, Sekondi, Winneba, Adda, Kitta, Axim, Dixcove, and Newtown.

Climate.—The climate of the Gold coast is damp, hot, malarious, and unhealthy for the continued residence of Europeans, who suffer from coast fevers and at times from dysentery, although yellow fever is unknown. The mean temperature in the shade is 82°, the range being from 68° to 87°. The rainy seasons are from March to July and September and October. From November to February is the cool dry season.

Produce.—The produce of the Gold coast is chiefly sent to Great Britain. Gold is one of the principal exports, mining companies are being established; ivory, gum, monkey skins, and oil are also exported. This coast is the region of the oil palm, where it grows in great profusion.

Lagos colony and protectorate comprises the islands of Lagos and Iddo, and reaches from the boundary of the French protectorate on the west, which is the middle of Ajarra creek to where it ceases to separate the kingdom of Porto Novo from that of Pokra, and thence to latitude 9° N.; and from the meridian of Ajarra creek in Porto Novo lagoon south, to the seacoast; to Benin river in longitude 5° 10′ E. on the east.

Lagos island and port were ceded to Great Britain by King Docemo in 1861. In 1866 the territories were separated from the Gold Coast colony, and erected into a separate colony. It has now a constitution of its own, having Badagri in the west, and Palma and Lekki to the east. Lagos has communication with the interior by means of the lagoons and creeks which extend in all directions. A very extensive trade has grown up, nearly the

whole of which being between England and Germany. Palm kernels and palm oil are the chief exports; ivory, cotton, and guinea grains are also exported.

Climate.—Malaria fevers, dysentery, diseases of the liver and spleen, and sunstroke, are the diseases due to climatic causes, against which special precautions are requisite. The rainy season is from May to October.

Niger protectorate includes the territories on the coast between the eastern boundary of Lagos and the right bank at the mouth of the Rio del Rey; from there the eastern boundary extends northeastward to Yola on on the Binué river. It also comprises the territories in the basin of the Niger and its affluents under the government of the Royal Niger company. The oil rivers are in this district, and offer exceptionable facilities for penetrating the interior; they are cheifly branches of the Niger and form the Niger delta, but those to the eastward of the Niger have sources independent of that river; although close to the seacoast, within tidal influence, the estuaries of these rivers are interconnected by a network of more or less navigable creeks, which, by a small amount of artificial aid, would render an inland navigation practicable between Dahomey and the Kamerun.

Climate.—The rains generally commence at the mouths of the palm oil rivers in the latter end of May, and gradually increase with strong SSW. and SW. breezes during July and August; toward the end of September they gradually assuage. In July and August heavy squalls frequently prevail, and in these months the wind rarely shifts from SW. more than a point or two to the southward; the rain is incessant for days except for an hour or two about noon.

In October the weather becomes more settled, with light land winds and occasional showers of rain with moderate sea breezes in the daytime.

The temperature is equable, seldom reaching above 90° in the shade, or falling below 65°, generally ranging during the twenty-four hours between 75° and 87°. The greatest danger to health occurs from catching cold; excesses of any kind in eating or drinking and exposures to the direct rays of the sun, are also to be guarded against. By attending to these three injunctions it is not difficult to maintain a healthy condition.

Liberia is an independent negro republic, founded in 1823 on the coast of North Guinea; they claim between the San Pedro river on the SE., in longitude 6° 40′ W. and Manna river to the NW. The population numbers about 18,000 immigrants from America and their descendants, and of aborigines 1,000,000. Monrovia is the capital and has a population of 6,000.

German possessions.—The Kameruns are under the German protectorate. The western boundary of the protectorate is the left bank of the Rio del Rey.

The rainy season is the busy time with the traders, as they can then navigate the creeks with their canoes.

The Portuguese possess the coast from cape Roxo in latitude 12° 20′ N. to latitude 10° 54′ N., including the Bijourga islands.

Seasons.—On the whole extent of the African coast there are two seasons, namely, the rainy and dry seasons. The division of the two is connected with the periods when the sun crosses from one hemisphere to the other, and is modified as it advances or recedes from the equator.

North latitude.—*The rainy season* commences at each place on the coast north of the equator about the time when the sun passes the zenith of that place in its course to the northward. It is usually during the month following this event that the change of weather takes place. At the isles de Los in latitude 9½° N., the first point exposed to the rainy season, the first violent squalls do not occur before the 10th or 15th of May.

The rainy season at any place continues from four to six months, according to the latitude and the rains continue to decrease, both in frequency and violence, during the two latter months of the season. In ten days or two weeks after the sun has passed the zenith of any place on its way south, it is considered as free from bad weather.

On the greater part of the coast, from cape Bojador to the isles de Los, regular winds blow and no rain ever falls during the eight months, September to April, when the sun is south of 10° N.

The dry season commences in the latter part of October at Senegal, a little later at Gorée, and at each intermediate place toward the equator it becomes gradually later. It is not until December that its return is observed in the parallel of the isles de Los.

Winds.—Variable winds prevail in both hemispheres beyond the polar limits of the trade winds. In the North Atlantic ocean, when the sun is in the northern hemisphere, the prevailing westerly winds are SW. and WSW.; if, on the contrary, the sun is in the southern hemisphere, they are more frequently experienced from WNW. and NW. This latter period is that of gales and bad weather between North America and Europe. In the English channel easterly winds prevail in February, March, April, and part of May; during the other months of the year westerly winds predominate.

In the South Atlantic ocean the westerly winds vary from NW. to SW., but they are changeable and irregular. In the zone between the parallels of 28° and 35° S., the winds which are most frequently met between September and May are those from NE. through north to NW.; and from NW. through west to SW., principally during June, July, and August.

Trade winds.—The average polar limit of the Northeast trade wind in the Atlantic ocean extends to the parallel of 27° N., while that of the Southeast trade lies on a line between the cape of Good Hope and the

islands of Trinidad and Martin Vaz. These limits vary about 3° N. or S. with the position of the sun. The equatorial limits of these winds generally vary in the same manner; that of the Northeast trade traveling from 13½° N. in August to 2½° N. in February, on the meridian of 25° W.; while that of the Southeast trade changes from 12° N. to 1½° N. between the same months and in the same longitude. The equatorial limit of the Northeast trade wind verges, according to the season, more or less towards the equator; but it seldom passes southward of it; the Southeast trade wind, on the contrary, occasionally extends as far as 10° N. on the meridian of 30° W. during the month of August. Between the equatorial limits of the Northeast and Southeast trade winds extends the zone or belt of calms and light airs named the "doldrums." This zone is narrowest in February and broadest in August, averaging 100 miles in the former month and 300 miles in the latter. When the sun is in the southern hemisphere, and at its greatest distance from the equator the Northeast trade wind inclines more to the northward, and stronger winds are experienced than at any other time. If the sun be in the northern hemisphere the Northeast trade inclines more to the eastward.

During the northern summer the trade-wind region is sometimes entered before reaching the latitude of Madeira; this occurrence is, however, exceptional. Between the months of November and March the variable winds of the temperate zone occasionally extend as far south as latitude 20° N

The Northeast trade wind varies considerably in its direction when under the influence of the land, and to the eastward of longitude 25° W., when within 400 or 500 miles of the coast of Africa, it blows more from the northward than it does in the open ocean. Between the Canary and cape Verde islands during the northern summer months, it blows from NNE. to NE. for half the time; and during the winter months, from January to March, the wind in the neighborhood of cape Verde occasionally draws to the NW.

It will be seen that the most favorable time for crossing the line will be from December to June, when the passage will be less interrupted by calms, squalls, and variable winds.

Sometimes the Northeast and Southeast trade winds meet, generally somewhere about the meridian of 28° or 33° W., where a vessel may pass in a squall from one trade to the other.

Southwest monsoon.—In the gulf of Guinea, as far north as cape Palmas, the prevailing winds are SW. and southerly; between the latitude of cape Palmas and that of cape Roxo southwesterly winds prevail between June and September and northeasterly winds during the other months of the year; in the latitude of Sierra Leone this SW. wind extends from the shore to longitude 32° W. in the middle of the northern summer.

During the fine season land and sea breezes prevail with great regularity near the coasts and islands lying within the tropics.

Harmattan.—On the west coast of Africa, between cape Verde and cape Lopez, a very dry easterly wind, known as the Harmattan, sometimes blows in December, January, and February; it occasionally lasts five or six days, and has been known to continue as long as a fortnight, blowing with moderate force. It is always accompanied by a thick haze, which is experienced as far as 12 or 15 miles from the shore.

From Sierra Leone northward its direction is from ESE.; on the Gold coast NE.; and at cape Lopez NNE.

NOTE.—In November, 1889, the U. S. S. *Pensacola* found thick dry haze at 50 and 100 miles off shore, due to a microscopic dust which on examination proved to be largely formed of minute Dratomacæa. The Norwegian bark *Qvos*, in November, 1890, experienced a thick red haze in latitude 20°, 27′ N. and longitude 24° 10′ W. The captain states that the haze was so thick that it resembled fog rather than haze. The vessel passed close to San Antonio, cape Verdes, but nothing was seen, although it was between noon and 4 p. m. A red sand fell thick on the vessel so that the deck, rigging, and especially the sails were dyed red, the upper sails more so than the lower. It lasted from the morning of the 21st until between 8 p. m. and midnight of November 23d, about latitude 12° N. and longitude 26° W.

Tornadoes.—Tornadoes are violent gusts of wind of short duration blowing offshore, similar to the arched squalls—the thunderstorm and the "fall wind" of other climates. They are generally most frequent at the commencement and termination of the rainy season. In Sierra Leone the maximum frequencies are in May and in October. They seldom occur on the southern coast, and when they do they are less severe. These storms derive their name from the changes of wind while they last; they are presaged by pale copper-colored clouds during the day, which appear exceedingly black during the night, heaped up in heavy masses in the north and NE., and usually advancing against the wind; also by remarkable electrical phenomena; and, as they approach, by a gradual dying out of the prevailing wind.

When these signs are noticed every precaution should be taken to receive a tornado. The dark clouds spread rapidly in the horizon, and approach in a clearly defined and regular arch rising rapidly, from which thunder and lightning constantly proceed. The violence of the wind may be estimated from the regularity of the arch, which is most clearly defined with the heaviest tornadoes. They are preceded by a few seconds of calm, and when the arch has reached an altitude of about 45°, the wind bursts out from NE.; it veers rapidly to east and SE., blowing with the same violence until it has changed to south and SW., when the rain commences; after which the wind dies out. Tornadoes are frequently followed by a calm; and it has been remarked that when the wind precedes the rain it

blows with greater force. It is advisable to receive these storms with all sails furled, except the jib, or some other head sail to facilitate paying off before the wind, because they seldom last over 1½ hours; the wind changes rapidly, and it is sometimes of hurricane force.

On the coast north of the Gaboon, near to Fernando Po, tornadoes sometimes blow from the NW., hauling to west and south; but this is of very rare occurrence.

Barometer.—The average range of the barometer in the higher latitudes (60°–50° N.) is about 1.5 inches, but on extraordinary occasions ranges of 2.75 and 3 inches have been recorded.

In the intertropical regions the range varies from $\frac{4}{10}$ to $\frac{2}{10}$ of an inch, and in the neighborhood of the equator it seldom exceeds $\frac{15}{100}$ of an inch, this small change being due in great part to a regular diurnal variation. The average movement of the barometer within the tropics being thus confined within small limits, any interruption of the law may be deemed a warning of the approach of bad weather. The fall of the barometer in hurricanes ranges from 1.0 to 2.0 and even 2.5 inches, the rapidity of the fall and the depression of the mercury increases as the center of the storm approaches.

In the northern hemisphere the effect of the veering of the wind on the barometer is according to the following law:

With east, SE., and south winds the barometer falls.

With SW. winds the barometer ceases to fall and begins to rise.

With west, NW., and north winds the barometer rises.

With NE. winds the barometer ceases to rise and begins to fall.

While in the southern hemisphere the effect is as follows:

With east, NE., and north winds the barometer falls.

With NW. wind the barometer ceases to fall and begins to rise.

With west, SW., and south winds the barometer rises.

With SE. winds the barometer ceases to rise and begins to fall.

By the knowledge of the barometric pressure at a number of places 100 or 200 miles apart, we may know with considerable certainty, a few hours in advance, from which direction the wind may be expected to blow at any place, according to a law discovered by Professor Buys Ballot, and bearing his name. The rule is, "Stand with your left hand toward the place where the barometrical reading is lowest, and with your right hand toward that where it is highest, and you will have your back to the direction from which the wind may be expected to blow."

This rule applies to the northern hemisphere, but must be reversed in southern latitudes.

Thermometer.—The thermometer in the northern hemisphere rises with east, SE., and south winds; with a SW. wind it ceases to rise and begins to fall; it falls with west, NW. and north winds; and with a

NE. wind it ceases to fall and begins to rise. In the southern hemisphere it rises with east, NE., and north winds; with a NW. wind it ceases to rise and begins to fall; it falls with west, SW., and south winds; and with a SE. wind it ceases to rise and begins to fall.

Currents.—The currents of the ocean are properly distinguished by the different and significant names of "stream" and "drift." The drift current is merely the effect of wind on the surface of the water, as, for example, in the region of the trade winds, where the whole surface of the sea, generally speaking, is converted into a slow current moving to leeward. A drift current is therefore shallow and slow, and can run in no other direction than to leeward.

The stream current has been described as an accumulation of the parts of the drift into a collective mass, by the intervention of some obstacle. The mass then running off by means of its own gravity, and taking the direction imposed on it by the obstacle, becomes a stream of current, and in many cases a powerful stream, pursuing its way like a vast river through the ocean.

Rennel current.—The easterly current from the North Atlantic ocean strikes the land near cape Ortegal, in Spain, and then appears to divide into two branches; the northern portion flows east along the north coast of Spain, then north along the west coast of France, where it is felt at 30 or 40 miles off shore, and is 15 or 20 miles across. It has been found to run at the rate of from ½ to ⅔ and sometimes one mile an hour, the velocity varying according to the strength and direction of the wind, that from the westward causing a heavy swell and considerable augmentation in its strength. The current becomes wider as it proceeds northward; in the latitude of Brest it is 80 miles across, and its direction nearly NW. It passes westward of Ushant at 15 or 20 miles from that island, crosses the entrance of the English channel, and takes a westerly direction from the Scilly isles. At the entrance of the Irish sea it is divided into two branches, one of which is diverted into that sea, whilst the principal branch flows WNW. and west towards cape Clear.

Cape Finisterre to cape Verde.—It may be taken for granted that the whole surface of that part of the Atlantic ocean between the parallels 40° and 30° N., and from a distance of 100 miles from the shore to 500 miles west of it, is in motion toward the strait of Gibraltar and the African coast; this direction of current is experienced when 50 miles west of Madeira, westward of which position it sets to the southwestward.

NOTE.—The above paragraph expresses generally what has been formerly published about the Rennel current, but from experiments recently carried on by Prince Albert I, of Monaco, and Lt. A. Hautreuse, French navy, and from reports of masters of vessels the existence of the Rennel current and set of the same is left in considerable doubt, if not entirely disproved.

From cape Finisterre the current generally flows to SE. and south along the coast of Portugal as far as cape St. Vincent, when it runs easterly toward the strait of Gibraltar.

From the strait of Gibraltar to the Canary islands the current within 100 miles from the coast flows to the westward, following the bends of the shore; among the Canary islands it is irregular.

From the Canaries to the cape Verde islands it generally sets from SSW. to SW. with a velocity of from 6 to 24 miles a day, being variable according to the direction, duration, and force of the wind.

Guinea current.—The Guinea current is a stream current running to the eastward along that part of the African coast comprised chiefly between cape Roxo and the bight of Biafra, extending southward to the 3d and 2d parallels of North latitude. Its western limit can be traced at all seasons of the year as far as the 23d meridian of West longitude, but in the summer and autumn months especially (July to November), an easterly current extending beyond this meridian to that of 53° W. is frequently experienced; this is probably an expansion of the Guinea current proper.

The greatest velocity of the Guinea current is stated to be off cape Palmas. The space separating the Guinea and Equatorial currents is generally limited, thus presenting the remarkable feature of two well-defined streams running in exactly opposite directions side by side.

The Guinea current, at all seasons, may be considered a warmer stream than the Equatorial, the temperature is generally above 80°.

Cape Verde to Sierra Leone.—On this coast, extending 150 to 200 miles from the shore, the winds and currents change with the seasons. From June to September squally SW. winds and a NE. or northerly current are experienced. From October to May, when NE. and northerly winds prevail, a southeasterly current is experienced.

Sierra Leone to cape Palmas.—The current on this part of the coast is influenced by the wind. Between May and October it sets to the NW. with winds south of SW., and to the SE. with winds west of SW.; in November there is generally a current setting NW.; from December to May a current setting SE.

Bight of Benin.—In the harmattan season (December to February) the Guinea current near the land in the bight of Benin is checked, and inshore a westerly set is felt. Heavy tornadoes have a similar effect in checking the Guinea current. The surface temperature of the sea is generally about 80° F. at all seasons of the year.

Equatorial current.—The Equatorial current in its course between the continents of Africa and America, may be considered chiefly as a "drift" current, formed of water brought from a cooler region by the Southeast trade wind. It may be said to commence in the neighborhood of Annobon island, or immediately south of the equator, between the 2d and 8th

meridians of East longitude, although from this locality a continuity of the northerly drift along the coast of South Africa, as well as from the Kongo river, may be traced. The surface temperature in its eastern part is several degrees colder for a great part of the year than the adjacent Guinea current, affording evidence of receiving waters from a remote and colder parallel.

The Equatorial current appears to attain its greatest volume and velocity during the season of the northern summer. From the African coast to about the 15th degree of West longitude, the maximum strength has been observed in June and July; westward of that meridian, at successive later periods, or between July and October; being, however, mainly a "drift" current, it is probably subject to irregularities in strength, depending on the winds.

The northern boundary, or, rather, the definite line of separation between it and the Guinea current, has been well traced in the space extending from the meridian of Greenwich to 23° W.; and is found to vary little at the several seasons of the year; for example, in the 20th West meridian, the "line of separation" in October and November is in 5° N.; in March and April in 2½° N.; in the 5th degree of West longitude the "line of separation" appears to be generally constant in 2° N. Approaching the African coast, Annobon island is considered to be at all seasons in the Equatorial current, Princes island in the Guinea current, and St. Thomas, situated nearly midway between the two, as within the influence of one or the other current, according to the seasons.

From Annobon island to about the 15th meridian of West longitude, the following are the average surface temperatures of the Equatorial current:

December to March	70° to 82° F.
March to July	82° to 72° F.
July to October	72° to 75° F.
October to December	75° to 78° F.

Westward of the 15th meridian the surface temperatures at the several seasons lessen materially in their annual range, and the Equatorial current gradually loses its earlier features of being a cold water stream at one particular season of the year.

Kongo stream.—The stream of this river is occasionally felt when 300 miles from its entrance, and the discoloration of the sea is clearly discernible at that distance. It runs with almost undeviating regularity to the NW. and NNW., decreasing in strength as it extends seaward; its rate is about 2 miles an hour until absorbed in the Equatorial current.

Effects of refraction.—Navigators should constantly bear in mind that the extraordinary refraction produced by the heated atmosphere along the whole coast of western Africa is a continual source of error, not only in

observations for latitude but also in chronometric longitudes, and one against which they can make no provision, as the altitudes of the sun are as often found to be too little as too great. Their only resource will be that of verifying the observations made in the day by altitudes taken at night of stars and planets. And not only is the seaman thus puzzled when making a landfall, or in recognizing a headland by means of the latitude, but he is exposed by the same cause to another very serious deception; for this excessive and ever varying refraction, sometimes amounting almost to a mirage, renders it difficult to make a correct estimate of the distance of the land. In this case he may indeed have recourse to the lead, as a bank of soundings of considerable breadth extends from most parts of western Africa; or, when any extent of coast is in sight, cross bearings will afford an immediate solution of his doubts; in certain situations, the change of bearing of an object on shore, at each extreme of a short distance measured by the log, will give a close approximation to its real distance. Still he should be on his guard against this species of fallacy, for at times the distant shore will appear alarmingly close to the vessel; and at others the really near land will appear removed to such a distance as to impose upon the most practiced and experienced eye.

Tides.—The tides are not of great interest in general navigation; but they are very important when navigating near the land. They do not extend far off shore, but their effects are various. The general limit of their influence on the western coast of Africa is from 12 to 15 miles from the entrance to the principal rivers, or on the edges of the banks and shoals detached from the coast; in some localities their limit is 4 to 5 miles, even less, from the coast itself, as in the gulf of Guinea.

The rise and fall of the tides along the whole coast varies between 3 and 16 feet; the latter occurs only in a few rivers, such as the Nunez; the general rise is between 6 and 10 feet. At some places, such as St. Louis, Los Islands, Kasamanze, Rio Nunez, the highest tides occur about 24 hours after the full and change.

Soundings.—With a few exceptions, there is a plateau of soundings extending along the whole coast of Africa which enables vessels to anchor, and affords an excellent guide when approaching the land and navigating close to the coast.

The gradual decrease in the depth as the coast is approached, affords a means of approximating the distance off; many of the vessels lost on it have gone ashore from a want of sufficient attention to the soundings. The mariner is again warned that the safest way of navigating near the coast of Africa is to keep the lead constantly in use.

Without the bank of soundings bordering the coast from cape Spartel to the cape of Good Hope, a very large fraction of it would be inaccessible; and in the greatest portion, commerce would be hindered by the

impossibility of communicating with the shore; it is now rendered very difficult by the line of breakers. Except where the coast is steep-to, this bank extends about 20 miles off shore, in some places 10 miles. South of the Bissagos, on the parallel of cape Verga, it is 130 miles wide. On this limit the depth is from 90 to 100 fathoms.

The nature of the bottom is varied, but nearly everywhere sand predominates; sandy mud, black, brown, or greenish mud sometimes mixed with shells, is not uncommon. Plateaus of rocks are found near some parts of the coast of Marocco, but these are generally of small extent. It can be readily understood of how much importance a knowledge of the bank of soundings is to navigators. With the exception of those parts of the coast that are steep to, vessels may keep in 11 to 16 fathoms, and sometimes as little as 8½ fathoms; but there are exceptions to this rule which will be given in the descriptions of the coast.

CHAPTER II.

CAPE SPARTEL TO CAPE BOJADOR.

Cape Spartel (Raz-el-Skukkar), the NW. extremity of Africa, and the southwestern limit of the strait of Gibraltar, terminates in a mass of black conical-shaped rock, which, seen from the north and south, appears detached like an islet. It is commanded by high land which attains an elevation of 1,068 feet above the sea, being part of a chain running east and west; south of the cape the land falls rapidly, forming an extensive plain, in the middle of which is situated mount Nipple, remarkable by its isolation and conical form. The cape is skirted by a reef which extends from it about 400 yards, and foul ground also extends to the southwestward. With the lighthouse between the bearings of N. 72° E. (east mag.) and S. 86° E. (S. 68° E. mag.), the shore should not be approached within $\frac{3}{4}$ mile. The high land over cape Spartel is conspicuous when bearing ESE., as there are two remarkable gray patches about a third of its height from the summit.

Caution.—There is a depression in the land south of cape Spartel which might be mistaken for the entrance to the straits of Gibraltar at night, when the low land of the coast can not be seen. This error may be avoided by attention to the soundings; for the depth of the entrance to the strait is very much greater than that off this part of the African coast; and the decrease in the latter, as the shore is approached, is so gradual that there is ample warning of danger. It is also necessary to guard against the violent currents which sweep around cape Spartel, and particularly against the tide races which they sometimes produce.

Spartel bay.—Half a mile south of cape Spartel is a sandy bay where small vessels find shelter from easterly winds, in 6 or 7 fathoms water, at $\frac{1}{2}$ mile from the beach; heavy squalls, however, blow off shore, and a continual swell makes it difficult to land.

Light.—Half a mile eastward of the west extreme of cape Spartel is situated a square stone tower from which is exhibited, at 312 feet above the sea, a fixed white light, which should be seen in clear weather from a distance of 20 miles; from it the lighthouse on cape Trafalgar bears N. 12° W. (N. 6° E. mag.), distant 24 miles. There is a Lloyd's signal station at the lighthouse.

Soundings.—The 100-fathom line lies about 3 miles westward of cape Spartel, but immediately southward of the cape the bank within that depth increases its breadth to about 20 miles, and the 100-fathom line continues nearly parallel to the shore for a considerable distance.

Coast.—North of cape Spartel the coast is high and composed of uninterrupted steep cliffs, at the base of which a little beyond the cape, are some black pinnacle rocks above water named the Needles. About 1¼ miles NE. of the cape is situated Fraylecito point, at the termination of which is a small black islet surrounded by rocks. The coast thence turns eastward for 3 miles, and is high and irregular, but not so cliffy, to Judios point; the most projecting part between being Pigeon point, remarkable and well defined when seen from east or west. Judios point is more salient and remarkable than either of the other points, and is known from seaward rather by the white cliffs that form it than the point itself, which is only well defined when bearing east or west. The coast between cape Spartel and a point one mile east of Pigeon point is steep-to.

Judios bay.—At nearly ¾ mile eastward of Judios point is Judios bay, which has a small sandy beach at its head, the only one on this portion of the coast. A small stream of the same name as the bay discharges through it, and runs down a narrow valley which separates the mountain of cape Spartel from the mesa de Marchan (table-land of Marchan) which is contiguous to Tangier. These two heights form good points for distinguishing the coast from seaward, and are sufficiently remarkable to be recognizable even at night should the weather be clear. The valley through which Judios rivulet flows presents a remarkable break which completely separates the mountain of cape Spartel, that is uneven and irregular, from mesa de Marchan, which is level and not so high, being only 342 feet above the sea.

On the eastern point of the bay are the ruins of a fort, and a marabout tower stands on the slope of the western portion of mesa de Marchan.

Tangier bay.—A white and reddish cliff commences at Judios bay and terminates at Tangier point, distant one mile to the eastward; when seen from a distance it appears like a patch in the middle of the coast. The shore is here skirted by reefs, and Tangier point terminates in low rocks. The town of Tangier stands near the sea and on the eastern slope of the table-land of Marchan, the most remarkable objects, from their height, being the castle (la Casbah) and a mosque at the NW. angle of the town, the NE. angle being at Tangier point. The houses standing above each other and being entirely white are seen from some distance, but when approaching from the westward, the table-land of Marchan prevents the town from being seen until abreast of it.

The bay is 3 miles wide and one deep, Tangier point forming its western extremity and Malabata point its eastern. The bay from the offing appears much deeper than it is, from being surrounded by high land; nearly all its western shore is a clean sandy beach, but eastward of fort Arabi-el-Said (2½ miles east of the town) rocks and foul ground extend 300 yards from the foot of the cliffs at the coast line.

Tangier point is foul on its northern side for a distance of 400 yards and eastward and southward of it for a distance of ¼ mile; the 3-fathom line is found at a distance of from 600 to 800 yards from the shore.

There is an isolated conical hill about ⅔ mile inland over the head of the bay, named mount Direction, which serves as a mark for the anchorage; and a little east of it is another hill not so high on which there is a whitish tower. Between these two hills winds a small stream which flows into the sea near the ruins of old Tangier; it is crossed by two bridges, one of which is white, and that nearest the sea is in ruins.

Another rivulet joins the above immediately east of old Tangier. There are two batteries on the eastern side of Tangier bay—one at the termination of the sandy shore, close to which there is a tower in ruins, and another ½ mile farther to the NE.

From the foot of the battery at Tangier point, rocks which cover at high water extend, and upon them are the remains of an old mole, extending 400 yards eastward and affording shelter for small craft from northerly and NW. winds. About 300 yards farther southward is another reef consisting of a group of rocks, one of which is 12 feet high. Between the two reefs is a curved beach, off which the water is shallow, but where small vessels load and discharge cargo; the customhouse is situated on the beach, and this is the only place where landing is permitted. Easterly and SE. winds send in a sea, when the beach can not be approached without considerable risk.

Tangier (Tanjah).—The town of Tangier is enclosed by high walls. It is of ancient date, the houses low and flat roofed and the streets very narrow. The chief buildings are the mosque, and the Saracenic castle. Outside of the town are the ruins of an old bridge. The population is about 10,000, including a large number of Jews. It is the residence of the consuls-general, and consuls of the principal nations, and a few European merchants. The gates of the town are closed at sunset.

The United States is represented by a consul and vice consul.

Supplies.—Fresh provisions in small quantities can be obtained. Water is scarce.

The town is in telegraphic communication with Gibraltar.

Lights.—From the end of a boat landing pier near the customhouse at Tangier is exhibited, at an elevation of 20 feet above high water, a green light, visible in clear weather from a distance of 3 miles. A red and white light is shown from a lighthouse erected on the platform of the low battery at the SE. angle of sea wall. It shows red between south (S. 18° W. mag.) and S. 55° W. (S. 73° W. mag.), and white from S. 55° W. (S. 73° W. mag.) over Tangier road. The red light should be visible 5 miles.

Bourée rock lies at about ½ mile from the southeastern shore of the bay. It is about 300 yards in extent, and has from 3 to 12 feet of water over it, though the sea seldom breaks on it. From its shoalest part, mount Direction bears S. 21° W. (S. 39° W. mag.) and White tower (marabout) east of mount Direction S. 2° W. (S. 20° W. mag.) There is a depth of from 4 to 6½ fathoms water between it and the shore, and about the same depths near it outside.

Anchorage.—Tangier bay is the only anchorage of any importance on the south coast of the strait of Gibraltar, and where vessels of any size may anchor. Although exposed to winds from NW. round by north to NE., it affords security with those from other points of the compass NW. winds send in much sea, that is felt even with the wind as far round as SW.; those between north and NE. do not last long nor send in much sea. A vessel may anchor anywhere in the middle of the bay in about 7½ fathoms water, sand and good holding ground, with mount Direction bearing about south (S. 18° W. mag.). A large vessel should keep Judios point open of the fort in ruins on the east point of Judios bay, and also Europa point open of Malabata point. Small vessels anchor nearer the shore. During the winter months vessels should be prepared to leave quickly.

A vessel entering Tangier bay during an easterly gale, will find convenient anchorage off a small beach about a mile southward of Malabata point, in 8 or 10 fathoms water, where there is better shelter than further westward, and it is a fair position from which to continue the voyage when the wind slackens or changes. The 3-fathom line in this eastern portion of Tangier bay lies at a general distance of about 400 yards from the shore, but at $1\frac{1}{10}$ miles south of Malabata point, 2¾ fathoms is found a nearly 600 yards from the coast; east and west of which and more in the center of the bay are two shoals with 4¾ fathoms water on them. When working out of the bay and standing towards old Tangier, keep Europa point open north of Malabata point to avoid Bourée rock.

Tides.—The flood stream in the offing north of Tangier bay runs from east to west, and the ebb in the reverse direction, turning in mid-channel at high and low water by the shore. Three hours after it is slack water in the offing or at about half ebb by the shore at Tangier, the ebb stream within the bay runs from east to west or in a direction contrary to the offing stream. Northward of Judios point, the tidal stream is strong causing eddies both on the flood and ebb resembling breakers, however little sea there may be; this occurs more especially during springs.

Malabata point, at the eastern extremity of Tangier bay, is a bold prominent headland terminating in cliffs and bordered by rocks, which extend 425 yards from it in a southwesterly direction, it has on it a battery and a circular white tower, the land rising from the point to a height of 792 feet

Almirante rock.—A rocky shoal with 3½ to 4¾ fathoms water on it lies N. 24° W. (N. 6° W. mag.) of the tower on Malabata point, distant 1,400 yards. There is generally a swell over it, and with strong winds from the westward the shoal breaks. Between Almirante rock and the shore there are from 8 to 12 fathoms; no large vessel should, however, use this channel except in cases of necessity, but pass Malabata point at a distance of one mile in 12 to 15 fathoms water.

Jeremias anchorage, about 4 miles southward of cape Spartel, is much resorted to by vessels prevented from entering the strait of Gibralter by strong easterly winds. At one mile from the shore there are about 20 fathoms water, over clean sandy bottom, and good holding ground. During the prevalence of easterly winds it is preferable for vessels wishing to enter the strait to keep over on the African coast rather than the Spanish, as it is free from danger, and they are in a better position to profit by any change in the direction or force of the wind; for this purpose it is prudent for a sailing vessel to keep under sail.

Directions.—When approaching the strait of Gibraltar from the westward if a levanter comes on, stand well to the southward, and work up to bring mount Nipple to bear N. 66° E. (N. 84° E. mag.) before anchoring. From this position to the southward heavy squalls are not generally experienced. A good berth may be had in 24 fathoms, and ½ mile from the shore there are 7 fathoms.

Arzila.—The coast from cape Spartel trends nearly straight in a southerly direction for 19 miles to Arzila, and, with the exception of a few rocky projections, is formed by a clean sandy beach with a line of low hills, which from the distance of ½ mile inland, slope gradually to the beach. Thirteen miles further inland there is a range of very conspicuous mountains, the loftiest of which, named Jebel Habib, is about 3,000 feet above the level of the sea. Another peak, mount Raven, lies 6 miles further northward and 10 miles inland, and is about 2,200 feet high. Close north of the town of Arzila there is a castle built by the Portuguese, but now in ruins; date trees, which rise above the walls, are growing in the court. Under the southern angle of the castle is a whitewashed tomb. The country in the neighborhood of the town is well wooded, and much land is laid out in gardens.

Anchorage.—There is good anchorage on this part of the coast; a good berth is in 15 fathoms, on a bottom of sand and small shells at 1½ miles from shore, with cape Spartel bearing N. 21° E. (N. 39° E. mag.) and the town of Arzila S. 2° W. (S. 20° W. mag.) distant 5 miles; further to the southward, in 13 fathoms, coral rock will be found mixed with gravel, when the center of Arzila town bears S. 21° E. (S. 3° E. mag.) distant 2½ miles. There is reported to be a mackerel fishery about this part of the

coast on which 20 or 30 Spanish and Portuguese feluccas are employed during the fishing season.

Caution.—It is against the law of Marocco for any person to land on a part of the coast where there is not a port for their reception.

Coast.—From Arzila the coast continues in a general southwesterly direction, and presents nearly the same appearance, the depth at a distance of 3 miles from the shore being 25 to 30 fathoms, gravel. At 4 miles south of Arzila the coast hills rise to a height of 734 feet. Haffat-el-beida, or the White cliff, 8 miles south of Arzila, stands about 300 feet above the sea, and presents in all directions the form of a wedge; it serves to identify this part of the coast. The face or section of this cliff shows the strata lying at an angle of 70° with the horizon.

El Araish.—About 8 miles southward of White cliff is El Araish, on the steep southern point of the Wadi el Khos (the bow), which here flows through a fertile valley; the sudden bends in the river having probably suggested its Arabic name. A large castle on the summit of the hill, a lofty mosque, and several towers, give this town an imposing appearance when seen from seaward; this, however, soon vanishes on approaching it. The environs are laid out in gardens, from whence the town derives its name (El Araish signifying a pleasure garden), but they are in a wild uncultivated state. In 1886 there was a population of about 4,000 persons at El Araish (no census is taken). The only disease due to climate is intermittent fever in the summer months.

Quarantine.—Vessels are liable to quarantine.

Tides.—It is high water, full and change, at El Araish at 1h. 30m.; springs rise from 9 to 12 feet.

On the bar at the entrance of Wadi el Khos at low water there is a depth of 5 or 6 feet, deepening inside to 24 feet. The river takes an abrupt turn to the northward, and in the bend vessels moor.

Supplies.—Fresh provisions of all kinds, beef and mutton in abundance, may be obtained at moderate prices in the markets of El Araish.

Anchorage.—The best anchorage in the outer road of El Araish for vessels intending to enter the river is about a mile off shore, in 12 fathoms, on a sandy bottom, with a distant conical mountain named Jebel Sarsar appearing in the center of the entrance bearing S. 41° E. (S. 23° E. mag.); or in 10 fathoms with the north entrance point bearing S. 80° E. (S. 62° E. mag.) distant about 1¼ miles. The pap, or rising ground, on the north side of the river is 200 feet above the sea. The landing is difficult and dangerous.

Old Mámora.—About 21 miles southward of El Araish is the outlet of a stream reported to flow from a small inland lake; on the north point of the entrance there are several tombs kept well whitewashed, the most prominent of which is named after Mulair-Abu-Sallūm. Though the coast is

straight; there is tolerable anchorage off this river during the summer; at 400 yards from the bar of the river there is a depth of 5 fathoms, gradually increasing to 34 fathoms, at 2 miles off shore. The coast between El Araish and Old Mámora is generally about 300 feet high, with reddish cliffs for the northern 10 miles, and then sandhills partly covered with brushwood.

Rocky (Artlett) shoal lies 15 miles southward of Old Mámora, and one mile off shore; it has 8 fathoms on it, with 13 fathoms between it and the shore. From Rocky shoal Black rock bears S. 86° E. (S. 68° E. mag.).

Mehediya or New Mámora lies 60 miles SSW. of El Araish. The town stands on the lower slope of a hill which rises to the height of 456 feet, on the southern bank of the Wadi Sebu. It it celebrated for its ruins; the population, unfriendly to Europeans, is reported not to exceed 400, who subsist by the sale of a fish resembling salmon (shebbel).

Anchorage.—There is good anchorage off Wadi Sebu during summer, there being 16 fathoms, muddy bottom, at a distance of 2 miles from the shore, but in winter SW. and SSW. winds render it unsafe. Vessels approaching the land in the latitude of Mehediya will strike soundings in 100 fathoms, course sand, when distant about 18 miles from the shore, and will shoal to 50 fathoms at a distance of about 8 miles from the coast. During a calm vessels are often obliged to anchor in order to avoid being drifted on shore by the currents setting along the coast to the southward, sometimes with considerable force. The sea is discolored a long distance off.

Bank.—A bank on which the sea breaks heavily has been reported off Mehediya; 11 fathoms of water were found close to the breakers, which were about 3 miles from the land, and N. 88° W. (N. 70° W. mag.) of the fort of Mehediya.

Coast.—From Mehediya the coast trends in a southwestly direction, generally resembling that before described, but is rather more level, and wooded.

Sali.—At a distance of 17 miles from Mehediya the town of Slá, or Sali, stands on the northern bank, and near the mouth of the Abú Regreg river. It is encompassed by a wall 35 feet high, strengthened and flanked by towers at regular distances.

Rabat.—The town of Rabat extends along the opposite or southern bank of the Abú Regreg river, and is larger than Sali. The population of both together is estimated at 30,000.

Rabat is defended by fortifications which extend round the river and sea faces of the town. Both towns are remarkable for their white walls and minarets. Fever and ague are prevalent in the summer, but can be avoided by using ordinary precautions.

Supplies.—Beef, chickens, and vegetables can be bought here at moderate prices. A portion of the inhabitants are engaged in the manufacture of carpets, the colors of which are remarkably brilliant. Wool is exported in small quantities.

Communication by steamers with Gibraltar, London, and Marseilles.

Hassan tower.—This tower, eastward of the town of Rabat, is 180 feet in height, and, standing on a cliff which rises 70 feet above the river, may be seen from a distance of 15 or 20 miles.

Tides.—It is high water, full and change, at Rabat at 1h. 46m. (approximately); springs rise 9 to 12 feet.

Anchorage.—The best anchorage in Rabat road is with Hassan tower just open of the south entrance point of the river, and 2 miles from the shore, in 21 fathoms mud, or a steamer in fine weather might anchor in 10 fathoms at 1¼ miles off shore, with Hassan tower in line with the east angle of the fort.

Bar.—A sand bank which dries at low water is at the mouth of Abú Regreg river. The bar is dangerous to any but the smallest coaster. At spring tides there is not more than from 6½ to 7½ feet on the bar, except in a narrow tortuous channel only navigable by steamers. The channel is liable to change and the sand bank is increasing.

Landing.—There is always a heavy rolling swell on the bar, but with the aid of local pilots it may be crossed in two places with a depth of 5 feet at low water; it is, however, very dangerous, as the banks constantly shift, and cause the loss of many coasting vessels. Landing is effected in lighters kept by the government, ordinary boats being unfit for the purpose.

Cape Fedala.—The first conspicuous object, 7 miles SSW. of Rabat, and built on the slope of a hill, is Massa tower, 190 feet high; and 22 miles farther along the coast the little town of Mansuria will be seen, the principal mosque of which rises to a height of 180 feet. Five miles farther is the village of Fedala, with a projecting cape to the westward of it, which when seen from a short distance has the appearance of an island, and affords some shelter to the small bay in front of the village. Vessels may anchor there in 5 or 6 fathoms, but very near the shore.

A good mark for cape Fedala is Saddle hill, 618 feet in height and about 7 miles inland. When the depression of this hill bears south (S. 18° W. mag.) it is in line with the cape.

From Rabat to cape Fedala there is no danger at a distance of 600 yards from the shore, and the bank of soundings to the 100-fathom line is upwards of 20 miles in breadth and tolerably regular. At 22 miles WNW. of Rabat there is a depth of 162 fathoms, whence towards the shore it suddenly shoals to 90 and 80 fathoms, between which depth and that of 60 fathoms the bottom for many miles is of fine sand and mud. The coast between Rabat and cape Fedala slightly recedes, but the inland features scarcely vary in appearance; two lines of barren and gently undulating

hills running nearly parallel to the coast. The distant hills are from 200 to 400 feet high and lie 5 or 6 miles from the sea, while the coast range is not more than 200 feet in height, nor more than a mile from the beach, on which many patches of rock are intermixed with the sand, and down to which they gradually slope.

Banks.—Northeastward of cape Fedala, distant 6 miles, there is a bank of 17 fathoms from which others extend about 9 miles in a direction parallel with the shore and at a distance of about 3 to 4 miles from the coast. The least water on these banks is 15 fathoms and there is deep water between them.

Cape Dar el Beida is distant 13 miles from cape Fedala. Reefs extend from it to the distance of nearly ½ mile, and further off, northward of the cape, there is a rocky bank of 6 fathoms. A safe distance at which to pass the cape is 3 miles; 2¾ miles southward of the cape there is a cluster of isolated rocks near the shore, known as the Cockscomb.

Anchorage.—Northward and eastward of Dar el Beida the bottom is rocky in many parts of the bay between it and cape Fedala; this must be a very unsafe anchorage during the winter, not only from its foul bottom, but from the current, which sets obliquely on the shore, rendering it difficult for a vessel when weighing to clear it with an onshore wind. A good berth for steamers is ¾ mile off shore in 10 fathoms sand, with the center of the wall of the town of Dar el Beida (Daral-baida) bearing S. 5° W. (S. 23° W. mag.), and the fort, on which is a white tower, bearing S. 38° W. (S. 56° W. mag.); or in 6½ fathoms, hard sand, with British consulate flagstaff bearing S. 27° W. (S. 45° W. mag.), and the extreme of the NW. fort bearing S. 72° W. (west mag.).

Dar el Beida is also generally known by the name of Casa Blanca. The population is about 10,000, of which 200 are Europeans.

Landing.—The landing at Dar el Beida is the best on the coast between cape Spartel and Mogador, being formed by a passage between two ledges of rock nearly parallel. Strong west or NW. winds cut off communication with the shore.

Light.—A private harbor light is exhibited but is not to be depended upon. It is fixed white, showing a sector of red over west reef. It should be visible 7 miles.

Communication is by the regular English and French steamers trading along the coast.

Supplies.—Provisions are plentiful and cheap.

Coal.—In an emergency a small quantity might be obtained from the proprietor of a mill.

Quarantine is strictly enforced.

Coast.—From Dar el Beida the coast runs nearly straight in a WSW. direction for a distance of 35 miles to Azimur point, the eastern 2 miles

being rocky, but the rest a broad sandy beach, inside of which two parallel ranges of hills, of 300 and 400 feet in height, rise at a distance of 2 and 6 miles from the sea, and are partially covered with brushwood. For a distance of about 10 miles in the middle of this stretch are some offlying rocks, close to the beach. Where they commence breakers extend out for over one mile, and at their southern end a mile off shore is a 3-fathom patch.

Azimur.—At Azimur point the coast suddenly bends southward to the mouth of the Wadi-um-er-Rebia (mother of herbage), on the south bank of which and 120 feet above the sea stands the town of Azimur. The river has a bar of sand across its mouth which dries nearly across at low water; though on the inside it is reported to be deep and rapid.

Cape Mazighan.—From cape Mazighan a reef extends more than a mile to the northeastward, with shoal water beyond it. This reef somewhat shelters the anchorage for small craft in westerly winds, notwithstanding which a heavy swell rolls in. The reef is reported as extending.

A shoal, with 4 fathoms on it, gravel bottom, lies eastward of the north extreme of cape Mazighan, 1½ miles from the shore; vessels should not attempt to pass between this shoal and the coast.

Directions.—Cape Mazighan should not be approached nearer than 2 miles. In running in for an anchorage it is well to get the large tower in the town in line with the NE. bastion of the city wall, bearing S. 38° W., (S. 56° W. mag.) at least 4 miles distant, and then to run S. 41° E., (S. 23° E. mag.) for 2 miles before heading up to the town, where the best anchorage is in 8 fathoms at less than a mile from the landing place. Further eastward, in the eastern portion of the bay, the general depth is from 7 to 10 fathoms, fine dark sand, but this would be a wild and dangerous anchorage during winter. The sands on the SE. side of the bay are said to be of a shifting nature, and wrecks are not uncommon.

Mazighan is known to the Moors as Burjah (fortress). The fortifications are of quadrangular shape, of great thickness, and surrounded by a broad moat, but the armament is obsolete and dilapidated. The chief tower, about 150 feet high, is conspicuous from seaward. A large water tank, excavated out of the rock, is situated under a portion of the fort, but is not now used. The anchorage is a dangerous one during the winter, being exposed to northerly winds. Population in 1886, 3,000.

Landing at low water is difficult, the entrance to the camber on the east side of the town being nearly blocked.

Supplies, etc.—Beef and mutton are abundant and cheap; fish and vegetables of excellent quality are easily procurable; a limited supply of fresh water can be obtained from wells. There are no ship's stores. Spanish five-franc pieces and pillar dollars are chiefly used.

Quarantine is strictly enforced during epidemics.

Communication is by British and French lines from London and Marseilles.

Coast.—Between Mazighan and north cape Blanco, distant 11 miles in a SW. direction, the coast should not be approached nearer than 2 miles, as detached rocks lie off the shore, and the soundings are very uneven. The beach also, though in many places a broad sand, is generally fringed with rocks. A barren range of hills, 200 feet above the sea, slope to the beach throughout its extent, and terminate close northward of cape Blanco, in a low, dark, and rocky cliff.

At about 4 miles NNE. of cape Blanco are the ruins of the ancient town of Tett, among which a tower 128 feet high and 148 feet above the sea is conspicuous from the offing.

Currents.—The general set of the currents off all the coast of Marocco, from cape Spartel southward, is to the south a little toward east or west, with an average rate of one knot an hour. On the bank of soundings they generally follow the trend of the coast to some extent; but when the wind prevails from west or NW., they set to the southward and toward the land. From this it is evident that the landfall of every port should be a little to the northward, so as not to be driven to leeward, and be obliged to beat up against both wind and current.

Tides.—The tidal currents are felt 6 to 7 miles off shore on this part of the coast. The current of the flood generally sets to NW. with an average rate of $\frac{1}{2}$ knot an hour; that of the ebb to SW. with a rate of $\frac{3}{5}$ to $\frac{7}{10}$ knot an hour; sometimes the latter sets to west a little south.

Bar.—The coast of Marocco is rendered dangerous by the prevailing westerly winds—not only in winter, but also during the fine season—on account of the line of breakers fronting the shore at a distance of $\frac{1}{4}$ mile, or in 3 to 5 fathoms. There are few places where this bar does not exist. Besides this, the westerly winds cause a heavy sea all along the coast, and there is always a heavy swell at the anchorages. It is prudent, therefore, not to remain in an unsheltered anchorage when westerly winds are blowing or the weather is unsettled.

North Cape Blanco, in latitude 33° 8′ N., probably derives its name from a white cliff, 170 feet high, a little southward of the headland that forms the cape; it is named North Cape Blanco, to distinguish it from the other cape of the same name situated in latitude 20° 47′ N.

Anchorage.—The bight on the SW. side of cape Blanco is reported to afford a temporary anchorage, but is only recommended for summer use.

Soundings.—At 19 miles NW. of cape Blanco, a depth of 111 fathoms, gravel will be found, and at 22 miles WNW. of the cape there is 100 fathoms, broken shell, from whence it shoals gradually to the shore.

Cape Cantin.—From a position 3 miles WNW. of cape Blanco, 3 miles WNW. of cape Cantin, that rises precipitously 200 feet above

the sea, the course is S. 45° W. (S. 63° W. mag.) and distance 47 miles. The cape is locally known as Ras-ul-Hadik, or Palm Grove cape. Four miles southward of cape Blanco there is a dark cliff which projects from the shore, and which when seen from some directions has an insular appearance.

About 6 miles southward of cape Blanco the hills rise gradually from the beach to a height of 450 feet, and appear to be the highest land on this part of the coast. About 10 miles southwestward of the cape, near the coast, there is a black tower with some ruins near it; and 21 miles further to the southwestward, the ruins of El Waladieh may be seen on the shore, with a smaller group of ruins 2½ miles SW. of them. There is said to be here an extensive lake, communicating with the sea, but the entrance was not discovered during the survey in 1835; it was probably concealed by the high surf which breaks upon this forbidden shore. Four miles northeastward of cape Cantin, the profile of the land, which is here about 450 feet above the sea, begins to lower gently, but close to the cape it again rises into a hummock, on the outer edge of which there is a white patch, seen both from the northward and the southward, and apparently the site of a former town. A singular gap in the ridge of the cape is also seen when either NE. or SW. of it.

Current.—Northward of cape Blanco the current generally sets to the southward at the rate of about ½ knot an hour; NW. of cape Cantin the current usually has the same direction, but a velocity of about 1½ knots an hour.

Westerly swell.—Between cape Spartel and cape Cantin allowance should be made for a heavy swell that generally sets directly on the coast.

Soundings.—At 11 miles W. by S. of cape Cantin, soundings may be obtained in 40 or 45 fathoms, sand and shells, decreasing irregularly to the cape, from which a reef or sandy spit extends to seaward for a distance of 1½ miles, with 5 fathoms on its extremity; at 3 miles westward of the cape the depth is only 17 fathoms.

Cape Safi, the northern point of Safi bay, is 12½ miles from cape Cantin; the intermediate coast is a continuous line of white cliff with a broad sandy beach at its foot; the cliff gradually rising to 500 feet high at cape Safi, which may be known by a square tower, said to be the tomb of a celebrated Moorish saint.

Safi bay.—At cape Safi the land suddenly recedes to the southeastward forming Safi bay, and the cliff drops into a ravine, the bed of a winter torrent. On the slope of the hill which rises from the south side of this ravine, stands the town of Safi, or more properly Asáfi, a place of considerable antiquity and importance, but which has only a population of about 6,000. The town may be distinguished a long way off by the whiteness of its walls and buildings. Water is scarce, and during the

summer it has to be procured from wells at a short distance southward of the town. The country in the neighborhood appears from seaward to be sandy and barren, but travelers assert that it is remarkably fertile.

Anchorage.—Safi bay, during the summer months, affords as good anchorage and smoother water than any other on the coast of Marocco, but it is entirely exposed to westerly winds; the bottom is of sand and mud, and there is generally a depth of about 15 fathoms at a mile from the shore, shoaling gradually to 5 fathoms at a few yards from the rocks. Small steamers, if prepared to quit at short notice, may anchor off the town with the citadel on the highest part of the town bearing N. 83° E. (S. 79° E. mag.), distant ¼ mile.

Landing.—The landing at Safi is at all times bad.

Wadi Tensift.—Seven miles southward of Safi, a red cliff named Sharf-el-Yahudi, or Jews cliff, rises to a height of 280 feet above the sea. Ten miles further southward is the mouth of Wadi Tensift, the principal river of Marocco; the general features of the coast throughout the space between Safi and Wadi Tensift are high sandhills, sometimes terminating in low cliffs and occasionally in sloping points, backed by hills above 600 feet high, covered with brushwood; Wadi Tensift, though a considerable river in the interior, had, in the month of August, 1835, its bar entirely dry at low water. On the northern bank of the river there is a castellated building in ruins.

Coast.—From Wadi Tensift the coast trends in a SW. ½ S. direction for a distance of 9 miles to the tomb of Sidi Abdalla Bettak; and further on, other tombs with the ruins of a town will be seen at the base of the Iron mountains. The coast, which from Wadi Tensift is barren and uncultivated, and from 200 to 300 feet in height, here shows renewed signs of cultivation. Jebel Hadid, or the Iron mountains, a large mass of high land extending more than 20 miles in length, rises to the height of 2,300 feet; on one of its summits the tomb of Sidi Wasman forms a very conspicuous object, useful in recognizing the land, and verifying the position of a vessel.

Hadid point.—At 45 miles SW. by S. of cape Safi is a sandy spit named Hadid point, which projects a mile beyond the general trend of the coast, terminating in a reef ½ mile in length; at 1½ miles west of the point the depth is 8 fathoms.

Coast.—From Hadid point the sandy beach continues in a south and southwesterly direction for a distance of 12 miles to Mogador; the view inland being bounded by the high Botof sandhills, which extend parallel to the beach at about a mile inland.

Soundings.—At 6 and 7 miles from the coast, between Safi and Mogador, the depth is 25 and 20 fathoms, whence, except off Hadid point, it gradually decreases to the shore.

Mogador approach.—When approaching the land on the parallel of Mogador, the first remarkable features which are seen are the distant craggy summits of mount Atlas, capped with snow and contrasting with the dark ridges of intermediate hills; while to the northward, the Jebel Hadid, or Iron mountains, appear like a large island. On a nearer approach to the shore a narrow white streak of sandhills, fringed at the top with verdure, seems to rise out of the sea, and at the distance of 8 or 10 miles the mosques and castles of Mogador begin to be distinctly seen, as well as the low black island which fronts it.

Soundings in 100 fathoms may be obtained at a distance of 22 miles from the shore, on the parallel of Mogador, eastward of which the water almost immediately becomes discolored; from the depth of 78 fathoms the soundings decrease gradually, the 50-fathom line being about 8 miles from the shore.

Mogador, or Suïra, consists of two parts, the citadel, and the outer town, in which is the Jews quarter, isolated and enclosed by walls. There is no modern artillery in the fortifications at Mogador, but a few old Spanish guns are still serviceable.

Care is necessary in approaching Mogador, on account of the low situation of the town and the haze that often overhangs the coast.

It stands on a low sandy spot which is surrounded by the sea at high water springs, and the adjacent ground is a swamp.

In 1886 the population was 15,000, 5,000 or 6,000 of whom were Jews and about 150 Europeans.

The United States is represented by a consular agent.

Landing.—Boats may land at high water alongside at the sea gate, or they may pass under the bridge and reach a more convenient landing place on the other side. At low water the whole place is dry and then the landing is on the reef. These must all be approached through a channel between the reefs to the southward. When there is not enough water to land at the customhouse, a small dredged channel, a little to the eastward, can be used by small boats.

Supplies.—No ship's stores or furniture. The market is excellent; provisions of all kinds, including poultry and game, are abundant and cheap, as are also fruit and vegetables. The price of beef is regulated daily by a superintending officer. Fish of excellent quality may be caught.

Formerly there was a great want of water, as the river is 1½ miles distant, but an aqueduct now conveys the stream to several large tanks built in different portions of the town. One of these has been placed very conveniently for the vessels in the harbor, as it lies close to a jetty inside the fortified bridge, and boats may fill there towards high water perfectly sheltered from all winds.

Coal may be obtained as a favor in small quantities. Vessels coal in the bay from lighters by baskets.

Repairs.—There are no repairing facilities.

Quarantine is strictly enforced in time of epidemics on vessels coming from all infected countries.

Dues.—The port charges for merchant vessels are high as well as those for ballast. Boat hire is also expensive.

Except for the Moorish government, the importation of tobacco, opium, and gunpowder is prohibited, and the exportation of live animals, wheat and barley, and weapons of all kinds.

Communication.—The vessels of the Mersey Steamship Company from London call fortnightly, touching at Gibraltar and the ports on the coast, and the vessels of the French Compagnie de Navigation Marocaine, which leave Marseilles, calling at Gibraltar, continuing to the Canary islands, and thence back by the same route.

Mogador is the southernmost port in Marocco open to Europeans.

Mogador island, about ½ mile long and ¼ mile broad, lies ½ mile from the opposite beach, and ¾ mile SW. of the town; it rises about 94 feet above the sea, and except upon the eastern side is surrounded by extensive detached islets and reefs, which extend 700 yards from its SW. extreme; the shores are cliffy and defended by several batteries.

A high islet, nearly joined to Mogador island, lies off its NE. extreme, and immediately NE. of this islet there is a rock above water.

Mogador harbor, or, as it is generally termed, Mogador bay, is formed by a double bight in the coast line; the northern part of which is somewhat sheltered from the long Atlantic swell by Mogador island.

Wreck.—The wreck of an iron steamer, no portion of which is visible, and which is a danger to navigation, lies in 4 fathoms at low water springs with the fort (ruin) on the northern side of harbor bearing N. 24° W. (N. 6° W. mag.) distant 900 yards. The wreck is sometimes marked by a buoy. The least depth at low water over the engine is 3 feet.

To enter.—The north entrance affords a clear channel, about 600 yards wide, with from 4 to 6 fathoms water in it; but in the harbor the depth decreases to 3, 4, and at the most 5 fathoms, on a rocky bottom with only a superficial covering of sand, and the clear space for anchoring is contracted to little more than ½ mile in length and the same in breadth by reefs extending from the town point, and by the 2-fathom flat which extends from the shore to Mogador island.

Leading mark.—The tomb of Sidi Mogodol, kept on a S. 52° E. (S. 34° E. mag.) bearing, leads safely in through the north entrance.

Anchorage.—For small vessels a good anchorage is in 3½ fathoms sand and mud, with the north extreme of the rocks off the north end of Mogador island, bearing west (N. 72° W. mag.), and the customhouse, N. 10° W. (N. 8° E. mag.), distant about ½ mile. On the first symptoms of more than an ordinary swell setting in, especially with a falling

barometer, vessels should leave at once and seek an offing, for in moderate weather a swell sometimes breaks heavily across the entrance, making it difficult to get out, even with steam. The anchorage about 300 yards eastward of Mogador island is not recommended, being exposed to an uneasy swell as well as the sweep of the tide. When there is not sufficient water for landing at the customhouse, a small dredged channel, a little to the eastward, can be used by small boats.

South entrance.—The bight southward of Mogador island is never used as an anchorage, but vessels of not more than 12 feet draft find it more convenient to cross the flat between the island and the mainland, and to run out in that direction with the benefit of the current than to work out through the northern entrance. A shoal of 1½ fathoms lies almost in mid-channel at 750 yards N. 80° W. (N. 62° W. mag.) of the old battery in ruins on the main. The east side of the customhouse kept on a N. 29° E. (N. 47° E. mag.) bearing will clear the shore. The channel is said to be filling up and should be used with caution.

Caution.—Vessels should moor in Mogador harbor, with a very short scope of cable and open hawse either to the northward or southward, according to the season of the year. From November to April this bay can scarcely be considered tenable, although it has often been asserted that vessels with good ground tackling need be under no apprehension. The nature of the bottom, however, shows that no reliance can be placed on hold of the anchors; and the necessity of veering more cable to a westerly gale, will increase the exposure of the vessel to the effects of the swell which rolls round both extremes of the island, and which again reacts from the opposite shore. In case of parting from the moorings in a gale, it would be difficult to save vessel or crew.

Anchorage for steamers.—A good berth for small steamers is in 4½ fathoms, with the northeastern extreme of Mogador island bearing S. 75° W. (N. 87° W. mag.), and the ruined battery on the mainland south of Mogador island, bearing S. 5° W. (S. 23° W. mag.). The wreck before spoken of lies nearly in this anchorage; steamers should anchor SW. of it.

Mogador road.—Vessels of more than 14 or 15 feet draft would find it imprudent, unless in fine summer weather, to anchor in the harbor; and if intending to remain but a short time, fair anchorage can be obtained outside Mogador island, open indeed from SSW. round by north to NE., and at all times exposed to a long swell, but comparatively safe during summer. A good berth is in 13 fathoms, fine dark sand, good holding ground, with the fort west of the customhouse bearing S. 74° E. (S. 56° E. mag.), and the rocky points at either extreme of Mogador island bearing S. 35° E. (S. 17° E. mag.) and S. 16° W. (S. 34° W. mag.). This roadstead is ¼ mile from the shore, and the pilots consider it the best outer

anchorage, though the holding ground is loose. Large vessels better lie in the road at all seasons.

Caution.—During the winter months, SW. winds spring up with but slight warning, rendering anchorage in the road dangerous; and with the first sign of more than ordinary swell setting in, especially with a falling barometer, an offing should be sought, for in moderate weather a swell sometimes breaks so heavily across the entrance as to make it difficult to get out even with steam.

Tides.—It is high water, full and change, in Mogador harbor at 1h. 18m.; springs rise 10 or 12 feet. The tides are generally regular in their rise and fall, but the direction of the tidal stream varies with the wind, and its strength is at all times weak.

Current.—The current inshore at Mogador is reported sometimes to set to the northward; but farther seaward it always sets to the southwestward. In the offing between Mazighan and Mogadore a set of 2 knots per hour to the SE. has been experienced in November.

Winds and weather.—NE. winds with fine weather prevail from March to December; during the remaining three months the winds are variable and the weather stormy.

East and SE. winds are rare; they are locally known as the Simoon, and are dry and hot.

Southerly winds are usually gentle and accompanied by fog; these winds generally veer to NW. before dying away.

Gales usually blow from WSW., and are preceded by a falling barometer, the horizon is overcast with heavy dark clouds, which move rapidly; a fine rain commences and is soon followed by a gale.

The climate of Mogador is agreeable, the range of the thermometer being from 64° to 70° F.

Diseases.—Diseases of the eye are prevalent, mostly among the Jews; the crews of vessels are subject to a gastric fever which lasts three or four days.

Coast.—From Mogador, the coast of Marocco, already so inaccessible and dangerous in the winter, becomes still more so, and is deservedly called the Iron coast; it is generally steep or rises in abrupt slopes from the sea. A narrow plain extends from the top of the cliffs to the first range of hillocks, which are separated by ravines; these are backed by other elevations, and these again by occasional mountains of the interior, which form the southern slope of mount Atlas. South of cape Nun the coast becomes lower, and presents a line of sand downs which extend to Bojador.

Cape Sim, or Ras Tegriwelt, is a low point of sand, which slopes gradually to the sea from a height of about 500 feet, and terminates in a reef of rocks which surrounds it and extends one mile from the land. The Botof sandhills, covered with dark verdure, are still visible when abreast

of cape Sim. The coast between this and Mogador is a continuous line of bare sandhills, 70 feet in height, and sloping gradually to the sea.

Wadi Tidsi.—Seven miles southward of cape Sim the Wadi Tidsi flows through a ravine; and not far from thence is situated the village of Koleï'at. From Wadi Tidsi to cape Tefelneh bold cliffs, apparently of sandstone, rise from the shore, and at 7 or 8 miles in the interior there is a range of hills between 2,000 and 3,000 feet above the sea.

Cape Tefelneh lies 18 miles south of cape Sim; it rises to 700 feet in height, and terminates in a point, from which a ledge of rocks extends ½ mile, with deep water close outside them.

Soundings.—At 6 miles west of cape Tefelneh the depth is 40 fathoms, whence it shoals gradually to the shore, except to the northward, where a reef extends some distance from the cape, and where the water should not be shoaled to less than 20 fathoms.

Anchorage.—There is reported to be anchorage ground in 10 fathoms, sand, under the south side of cape Tefelneh, with shelter from east and NE. winds.

Cape Ghir, or Ras Aferni, projects boldly into the sea at 29 miles southward of cape Tefelneh; the hills inland of the intermediate coast rising to the height of nearly 3,000 feet, and the country appearing, from its numerous villages, to be well inhabited, with several conspicuous tombs and scattered woods. The cape shows a bold bluff face, but slopes gradually on each side from the summit, which is about 1,200 feet high.

Santa Cruz.—The town of Santa Cruz, or Agadir, which is the most southern port of Marocco on the Atlantic ocean, stands on the summit of a hill about 600 feet above the sea, bearing S. 49° E. (S. 31° E. mag.), distant 18 miles from cape Ghir; the deep bay which intervenes offers a convenient anchorage during the prevalence of northeasterly winds. The beach is rocky from the cape to Wadi Tarmarakt, which enters the sea through a fertile valley, about 13 miles northwestward of Agadir. The hilly region which backs this part of the coast, and known as the Heights of Idantenan, is the western extremity of the chain of mount Atlas, and rises at 12 miles north of Agadir to the height of 4,400 feet.

Santa Cruz is much nearer than Mogador to the province of Sus, whence comes a considerable supply of almonds and gum.

Immediately south of Santa Cruz is situated the small fishing village of Fonti, where there is a boat harbor.

Agadir bay affords shelter from NE. and easterly winds. The depth of water decreases gradually toward the shore, and convenient anchorage may be had in 7 to 8 fathoms, one mile from the beach, with the castle bearing about north (N. 18° E. mag.); but the bay is open to westerly winds, and the anchorage is not tenable with the wind in this quarter. However, the bay is considered the best on the west coast of Marocco. Approaching

this anchorage it is necessary to keep close inshore until abreast of the castle, for the prevailing northerly wind would make it difficult to beat up from the offing. During the night it is not prudent to get in less than 12 to 14 fathoms.

Supplies.—The bay is well stocked with fish, large quantities of which are caught, dried, and sent to Mogador and the interior; this is the only trade which is pursued at Santa Cruz. Provisions are good and plentiful, and water easily procured.

Tides.—It is high water, full and change, at Santa Cruz at 0h. 45m.; springs rise about 9 feet.

Current.—The southerly current which prevails along the coast of Marocco is not felt when abreast of Agadir till at the distance of 6 or 7 miles from the land, being deflected by the projection of cape Ghir.

Coast.—Immediately southward of Santa Cruz a very low and flat country commences, and extends for 28 miles in a southerly direction.

Sus river.—This river, which arises at the foot of mount Atlas, discharges into the sea at about 5 miles southward of Agadir. A bar of sand extends across the entrance, which is nearly dry at low water, and can not at high water be entered by a vessel drawing more than 4 or 5 feet.

Seven springs.—From the Sus river the same description of sandy coast continues to the southward; at the distance of 7 miles are the Souwanieh, or wells of fresh water; also known as Tomieh, or the Seven springs. The anchorage off this place differs in no respect from that which can be found off almost every part of the coast.

Soundings.—At a distance of 17 miles west of Souwanieh there is a depth of 86 fathoms, dark sand; at 6 miles, 40 fathoms, sand and mud, decreasing gradually to the beach.

Wadi Mesa.—At the distance of 12 miles southward of Souwanieh there is a little river, Wadi Mesa, with a bar of sand across its entrance which dries at low water; it is said to have been formerly navigated by the Portuguese, and occasionally the depth of both the Sus and Mesa, is said to be 2 feet at low water. At a short distance within the bar, on the northern bank, there is a village; and to the southward, near the beach, an ancient castellated building.

Cape Agulá is only a slight projection of the coast line; a decided change, however, in the appearance of the coast begins at this point, for though the beach with a heavy surf breaking on it continues as to the northward, its bare appearance is now superseded by a series of green hills, which, as they approach the sea, form cliffs of sandstone about 100 feet in height. At a considerable distance inland there is a range of mountains, about 2,000 feet high, and much of the neighboring country appears to be wooded, cultivated, and well inhabited. The houses, which are built of dark-red brick or clay, are numerous, and some are large and sur-

rounded by farm buildings. The village of Agulá stands on a hill about a mile from the beach of a small sandy bay, into which the Wadi Assa flows.

Coast.—Twelve miles southward of Agulá the features of the country again alter; the hills resume their abrupt and barren appearance, and form successive ridges, gradually increasing in height till they join the line of distant mountains, which, as well as could be estimated, attain the height or nearly 4,0 0 feet, and appear to be the southwestern extremity of one of the offsets of the Atlas range. Still further to the southwestward these bare hills and the broad sandy beach give place to dark-red cliffs, broken into little bays and coves, in some of which, boats (the first seen southward of Santa Cruz) were hauled up. From the number of villages this part of the coast seems to be populous.

The principal settlements appear to be at Sidi-bu-Nuar, 5 miles south of cape Agulá; at Sidi-bu-el-Fadail, 9 miles farther south; at Garizim, the mouth of a small river 20 miles south of Agulá; and at Salmagat, where there are some small wells situated a little north of Wadi Guader.

At Wadi Ifni, 29 miles south of cape Agulá, a small white tomb near the shore is conspicuous. Near this tomb, at a height of 300 feet above the sea, is the village of Idufker.

Wadi Ifni, which is dry during the summer season, affords a landing place in fine weather.

At 4½ and 6½ miles south of Wadi Ifni are situated two mountain torrents, known as Tazerut and Wadi Kweraima, with a few houses near them.

Jorba or Sok Ensara is the name of a deep ravine where there are the ruins of an ancient mole; it lies in latitude 29° 14′ N.

Mountains.—Among the mountains which belong to the chain mentioned above is the Cockscomb, 2,400 feet in height, and farther south mount Wedge, 2,000 feet in height. The latter consists of two conical eminences of nearly equal elevation, which form a saddle when bearing S. 55° E. (S. 37° E. mag.). There is a break in the coast at the foot of these mountains resembling the entrance to a small bay. On the north side of this break, which is darker than the neighboring shore, there is a large white building and on the south side, on the summit of a reddish cliff, there are several houses.

Three miles south of mount Wedge, in latitude 29° 22′ N., there is a remarkable white cliff. The singularly curved and irregular strata of this cliff, together with a conical mountain, called the Sugarloaf, 3,900 feet in height, make an excellent mark for the locality. When near the coast the Sugarloaf appears isolated, but from a distance it is seen connected with a chain of mountains, of which it is the most easterly summit.

Soundings.—Northwest of the white cliff, at a distance of 20 miles from the shore, there is a depth of 100 fathoms, broken shell, outside of which the bank drops very suddenly; nearer the shore the depths decrease rapidly

to 60 fathoms. At 5 miles from the coast there are from 28 to 24 fathoms, coarse sand; and from thence the depth decreases more gradually to the beach.

Wadi Guader.—In latitude 29° 10′ N. a little bay, named Wadi Guader, or port Assaka, lies between two steep rocky points; the water in it is deep, and the bottom clean up to the beach; and though it affords no shelter for large vessels, yet landing may generally be effected there in the fine season.

The northern entrance point has on it a conspicuous white mark, and a small conical hill is situated on the right bank of the river close to the shore; further inland on the same parallel there is an isolated peak (Fogo) 2,970 feet high.

Glimim the chief town of Wadi Guader lies 2 or 3 miles to the NE. of the river; and immediately north of the town the Wadi Siad flows past it.

Playa Blanca river.—In latitude 29° N. the mountainous country terminates and a sandy desert commences. There is also a break there in the coast, which presents the appearance of the dry bed of a river. It is named by the Canary fishermen Rio de Playa Blanca. Playa Blanca river (also known as Wadi Bueda, Wadi Aureora, or Arrakont) is marked by an isolated conical hill and by a chain of mountains extending to the southward, known as the Table of cape Nun.

A small stream known as Bousefen river enters the sea close north of Playa Blanca river.

Coast.—The coast from hence trends SW. by W. ½ W. for 29 miles to cape Nun, the western portion being formed by bold sandstone cliffs, with sandy downs in the interior, but is entirely devoid of herbage.

The province of Sus is described as being peculiarly fertile and populous, and the inhabitants are less bigoted, and more friendly towards Christians than the Moors generally are. The real obstacle which opposes itself to opening a trade with this part of Marocco is the absence of secure harbors, or, indeed, of any tranquil anchorage.

Cape Nun, or Los Morretes, in latitude 28° 45′ N., presents a steep face of sandstone about 170 feet high; but as the cliffs for some distance on each side of it are nearly of the same elevation and the country inland an uninterrupted sandy desert, it is difficult to distinguish the exact projection till very near it.

Soundings.—The water is deep close to the shore, there are no offlying dangers, and the depth gradually increases from the extreme of the cape to the distance of 4 miles, where there are 30 fathoms, reddish sand; at 12 miles, 50 fathoms, dark sand; and at the distance of 30 miles from the coast, 85 fathoms, coarse red sand and shell; further out the water deepens suddenly.

Discolored water.—For some distance, both north and south of cape Nun, as well as to seaward, the water has a red tinge, with a thick, muddy

appearance, so that the track of the vessel is visible for some time. This discoloration of the water may have alarmed navigators with the apprehension of shoals, and may account for the alleged existence of a bank off the cape; but it is evidently occasioned by the immense volume of very fine sand which is blown off the desert and with which everything on board soon becomes coated, even when many miles from the shore. The water also of the Nun river, and of other streams which here discharge, and which are also all laden with this sand or dust, project it a long distance out to sea, till it is met by the current and dispersed.

Nun, or Assaka, river, which flows into the sea 5 miles southward of cape Nun, has been given a variety of names by different authors; that of the Nun has been retained from its proximity to the cape of that name. The mouth of the river was completely closed by a sand bank in 1886.

Nun river, when well open, may be recognized by two hills, which will then appear in the center of the gap; they are both conical, and on one of them, which is about 300 feet high, there are some ruins, said to be those of a Spanish fortress.

Wadi Shibika, or Wadi Draa.—About 30 miles SW. of Nun river, and in latitude 28° 19′ N., there is another river of about the same magnitude, to which the name of Wadi Nun has been equally often applied, and probably correctly, as the town of Wadi Nun is said to stand on its banks. Singularly enough the features of the coast adjacent to the mouth of each river are very similar, so that their latitudes became the best guides to distinguish them that can as yet be given. In the southernmost, or the Wadi Shibika, there appeared to be water enough for large boats, which it is said trade there from the island of Lanzarote, but the surf prevented any attempt to cross the bar in order to examine the interior.

When approaching Wadi Shibika, the table-land breaks into detached hills, which will help to identify it; the highest of these hills rises about 900 feet above the sea.

Boundary.—Wadi Shibika in about latitude 28° 19′ N. is considered to be the southern boundary of Marocco.

Coast.—At 12 miles SW. of cape Nun is the mouth of a torrent known as Uina Seguira, and at 21 miles from that cape a reef of rocks, partly uncovered at low water, forms a boat harbor, locally known as Meano or Uina, about ½ mile long and 400 yards wide, with depths in it of 3 fathoms in some places.

This harbor can be entered by boats, either through a channel among the reefs or between the south extreme of the breakers and the mainland.

At 2 miles south of this harbor is the torrent of Saibajarsa.

Anchorage.—The coast between the Nun river and Wadi Shibika is formed chiefly by sandstone cliffs, above which the table-land just shows, when seen at the distance of 3 miles from the shore; there is a regular

depth of 20 fathoms and good anchorage ground at that distance, which anchorage, however, is not safe before March nor after October.

Commerce.—If any attempt should ever be made to open a direct trade with this part of Marocco, either of these rivers would offer an eligible situation for a factory, as there appears to be sufficient evidence that inside the bars there is ample room and depth for vessels of some burden; that favorable opportunities for crossing the bars are frequent, and that the rivers are navigable for large boats for a considerable distance up the country.

Fisheries.—A fishery, which is prosecuted by the inhabitants of the Canary islands, commences at cape Nun; the fishermen seldom venturing further to the northward from their dread of the Moors, who on that part of the coast possess boats. But from cape Nun to the bank of Arguin, which is the southern limit of the fishery, a distance of about 600 miles, the inhabitants are unprovided with boats; and the fishermen therefore not only fish on the bank close inshore, but frequently land, as well to barter their fish for orchilla and the fine Barbary wool, as to procure water, but always with the greatest circumspection.

Coast.—From the Wadi Shibika the coast and inland features of the country continue the same in a southwesterly direction for a distance of 30 miles, to a headland known as El Morro, the cliffs being about 120 feet in height; but there they terminate, and a low sandy beach surmounted by sand hills, of which the northernmost is the highest, extends for a distance of 11 miles to Porto Consado.

The southernmost of these hills, named Gord-el-Jamar, is compicuous, being composed of red sand.

Porto Consado.—The entrance to this inlet is about ½ mile wide between the sandy shore on the port hand and a long narrow sandy spit on the starboard hand, with from 2 to 3 fathoms water in the channel across the bar; the water then deepens to 6 and 4 fathoms in the bay inside, which widens out to 2 miles and extends for about 4 miles, terminating in some cliffs; at the head of the bay there is an opening of 400 yards wide leading into an inner but smaller sheet of water, having an old tower and a supposed well on its shores. There is an outer bar at about 2 miles seaward. June and July are the worst months for surf on the bars. The best times for boats to cross is from low water to half flood.

A table hill, 400 feet high, between Porto Consado and the back land, is its only distinguishing mark. Nothing can be more dismal than the appearance of the shore hereabouts; for many miles there is not a dark spot to be seen to break the monotonous appearance of the sand, the fine particles of which mingling with the haze occasioned by the heavy surf, render the coast very indistinct.

Coast.—Cape Juby is 108 miles from cape Nun, the coast between receding about 12 miles, Wadi Nun being the point where the indentation is deepest.

At a short distance westward of Porto Consado cliffs from 90 to 100 feet in height again commence and continue for several miles; they consist of dark sandstone, and the bottom is also of dark sand, which gives a dark greenish appearance to the water. Inland, a flat desert extends as far as can be seen, but there is no beach, the sea breaking against the cliffs on which it appears to be gradually encroaching. Where the cliffs terminate, the country becomes broken into sand hills, partly covered with bushes, and coast trends in the direction of W. by S. for a distance of 15 miles to cape Juby, which is 36 miles from Porto Consado.

Current.—From Wadi Shibika the coast curves outward, and the current, which hitherto has nearly followed the direction of the shore, here strikes it obliquely, rendering this the most dangerous part of the coast between capes Spartel and Bojador, and fully accounting for the numerous wrecks which have occurred there, the timber from which is used by the inhabitants both for firewood and materials for building their huts. The swell too is almost invariably from the NW., and therefore sets directly into the bight, so that it is almost impossible for a sailing vessel embayed there to work off.

Cape Juby is a low sandy point terminating in a hummock covered with bushes, and having, when seen from all directions, the appearance of an island. A reef of rocks fronts the cape and extends out ⅓ mile from the shore. There is 10 fathoms of water close to it.

In making cape Juby it may be well to sight the coast 9 or 10 miles distant, and then run alongshore till the bush-covered knoll is seen. The cape does not show out well except from the NNE. and SSW. Making the coast a little to the SW., and standing north would perhaps be preferable, especially in the early morning when the sun is low. Between the reef, which extends southwestward from the cape, and the shore is a shallow basin, barred at the entrance, which is on the south side. At low water there is only 2 feet on the bar, and with some winds only one foot. The reef dries at low water.

It is reported that this small basin, which has a depth of about one fathom, is silting up. The bank on the south side is growing out.

The Northwest African Trading Company, established here in 1880, has constructed a fort, 37 feet high, on the SW. extremity of the reef which here borders the shore. At low water the mainland can be reached from the fort.

A large stone building has also been erected on the mainland as a storehouse and for carrying on trade with the Moors.

There are no supplies; water andfresh meat are obtained from Lanzarote.

Current.—It is reported that the current frequently runs to the southwestward at the rate of 6 knots round cape Juby. The *Especial* found it running at the rate of between 2 and 3 knots.

Anchorage in 8 fathoms, sand and broken shells, has been obtained about 800 yards WNW. of the fort, the depths regularly deepening to 10 and 14 fathoms at ¾ and one mile respectively from the coast.

Landing.—Landing may be effected at the steps on the eastern side of the fort, but at high water with onshore winds it is impossible. Care is necessary when approaching the landing place to avoid the shoal water extending about 200 yards south from the fort.

Landmarks.—The fort stands up well from seaward, appearing black and square, and may be recognized some time before the coast is made out. The fort, as well as the storehouse, is more conspicuous than the tufted hillock about ¼ mile eastward of cape Juby.

Tides.—It is high water, full and change, at the fort at about 12 hours; springs rise about 10 feet.

Trade.—In 1886 there were 7 Europeans in the fort, including a doctor and interpreter. The principal barter was in camels, sheep, goats, wool, and barley. Communication takes place by schooner with the Canary islands; Las Palmas being the headquarters of the Company.

Coast.—From cape Juby the coast turns to the southward, forming little bays, off the points of which are some detached rocks, though the general coast line is a sandy beach, with the exception of three small patches of cliff. At the distance of 4 or 5 miles inland there is a long range of broken sand hills, not exceeding 250 feet in height, named Los Matillos. In latitude 26° 46′ N. the sandy shore terminates, and a series of cliffs commences, extending in a southwesterly direction for a distance of about 40 miles, or to within 3 miles of the False cape of Bojador.

At about 15 miles south of cape Juby is the mouth of the Wadi Sakiet el Hamra; many of the streams on this coast are dry, except during the rainy season.

False Cape Bojador.—The cape is low and sandy, with a reef of rocks extending from it about 1½ miles to the northward.

Southwestward of False cape the coast forms a bight 16 miles across, the western point of which is fringed by rocks and from which the coast trends in a direct line SW. ½ S. for a distance of 10 miles to cape Bojador.

Seven Fathom bank.—A bank, with 7½ fathoms on it and 17 fathoms between it and shore, lies N. 68° W. (N. 50° W. mag.), distant 6 miles from False cape; this suspicious shoal has not yet been traced to its limits nor this portion of the main bank closely examined.

Currents.—It may be assumed that the surface water between cape St. Vincent (in Portugal) and the neighborhood of Rabat (on the coast of Africa) is in motion at the rate of 10 or 20 miles per day toward the strait of Gibraltar, thus causing a general current to the eastward. On the coast of Spain the stream runs to the southeastward; on the coast of Africa it has a tendency to the northeastward.

Between Mogador and cape Bojador the current between the shore and a position about 50 miles seaward of it runs in the direction of the coast to the southward and westward, so that its course may be safely inferred from the bends of the shore. Its greatest strength is usually found at the distance of from 3 to 6 miles from the land, gradually decreasing both inward and outward; its average rate within that belt is from ½ to ¾ knot an hour, as far as cape Juby. Off that point, owing to the conformation of the coast, and from being compressed by the Canary islands, its velocity somewhat increases. Off cape Cantin it sometimes attains a velocity of 1½ knots an hour. Off cape Bojador it flows at less than a knot an hour, and as far as could be observed it pursues its steady course uninfluenced by any change in the direction of the wind.

Winds and weather.—On the coast of Marocco during the winter months the prevailing winds are from north and NNE.; winds from the westward occasionally blow with considerable force and are frequently accompanied by thick and long continued fog.

During summer the prevailing winds are from NNW. through north to ENE., and blow generally freshly; between the Canary islands and the mainland NNW. winds are stronger than elsewhere.

Landing.—Between November and March landing on the coast can be effected with difficulty on account of the heavy surf, but during the summer months and also when the land wind is strong it is almost everywhere accessible.

CHAPTER III.

CAPE BOJADOR TO GAMBIA RIVER.

Cape Bojador.—When seen from the northward cape Bojador shows a strand of red sand, and has a gradual descent toward the sea, its western extremity, which is very low, forms a small bay with the cliff which adjoins. The eastern part of this cliff is the most remarkable and about 70 feet high. The shore presents an appearance of continuous sand hills and table-lands, scantily covered with small brush and creepers. The surf is exceedingly heavy along this coast. East of the cape, a small recess, with 9 fathoms, and smooth water is reported, but it was not found in 1886.

Current.—At 4 miles west of cape Bojador the current has been observed to set SSW. with a velocity of 1½ knots an hour.

Tides.—It is high water, full and change, at cape Bojador at noon; springs rise about 8 feet.

Coast.—From cape Bojador the coast trends about SSW. for a distance of 64 miles, to a remarkable cliff, named Peñha Grandé, whose height, about 300 feet, so far exceeds that of any other portion of this coast, that it serves as a good landmark. The general character of the shore thus far is alternate cliffs and sandy beaches, the former being the most extensive, and from 150 to 200 feet in height, with flat summits. The country in the interior has a dark appearance, though brushwood seems to be scarce.

Soundings.—The depth of water at a moderate distance from this part of the coast is considerable; at 2 miles from the beach, bottom can not be found at 22 fathoms; at a mile from the foot of Peñha Grandé cliff there is 26 fathoms, gravel and broken shells; and it is everywhere safe to approach and clean up to the beach.

Maluine bank lies within one mile of the shore, 21 miles south of cape Bojador, and north of the anchorage called by the islanders Pilones or Bumbalda. At low water the sea breaks on the shoalest part of the bank.

Pilones anchorage.—The anchorage of Pilones is on the open coast, in 9 to 10 fathoms of water, sandy bottom, south of Maluine bank, and abreast of a sand beach which is intersected by three little streams. The cliffs of Bumbalda commence close to the southern stream.

Garnet bay.—At 14 miles SSW. of Peñha Grandé there is a projecting cliff, which has received the name of Garnet head; to the southward of the coast it recedes and forms Garnet bay, which does not afford any shelter. This bay is known to the fishermen as Moro Anchoro.

Coast.—The coast south of Garnet head is composed of cliffs, crowned with sand downs, about 164 feet in height; some of the cliffs are a short distance from the sea, and are fronted by a line of rocks with a chain of sand downs between. The surface of the coast is flat, with barely perceptible undulations, caused by accumulations of sand; there is not a single trace of vegetation as far as a point called Seven capes. Here the shore again curves and forms a bay, which ends in a slight projection called Leven head. There is anchorage in this bay in 15 fathoms.

Deception cliff.—An almost straight line of low cliffs, 35 miles in length, extends from Leven head to Elbow point, also known as Punta Cavalho, with a depth of 11 to 14 fathoms at 5 miles from the shore. In latitude 24° N. a white sandy beach about 3 miles in length interrupts this line of cliffs, and, about 6 miles south of this beach, an irregular mount of rock and sand will be seen on the shore. It lies in latitude 23° 54′ N., and received the name of Deception cliff from its having assumed, till close in, the appearance of an island. The shore is fronted by a continuous line of breakers.

Ouro river.—Immediately southward of Deception cliff the basin at the mouth of the Ouro river may be seen over the low isthmus as well as over part of the peninsula which separates it from the sea; this peninsula is about 20 miles in length, terminating in 23° 36′ N. at Durnford point.

The Spaniards have erected a fort, armed with two small guns, on the elevation known as Mudge head, about 5 miles from the bar, and a Spanish gunboat is generally stationed off it as a check to the Moors, with whom a small trade is carried on at a convenient spot near the fort, no natives being allowed within it. No Moors were seen in the neighborhood of Point Durnford peninsula southward of Mudge head.

The general uniformity of the coast makes it exceedingly difficult when approaching the estuary of this river to ascertain the vessel's position by the appearance of the land. The soundings laid down on the Admiralty coast chart, as also the plan of the inlet or estuary inside the bar, are good guides; and there does not appear to be any alteration of importance since the partial survey in May, 1821, by H. M. S. *Leven*, which vesssel crossed the bar and anchored about 7 miles within it. Although the entrance is 4 miles wide it is nearly blocked by a sand bank which extends from the main, and by several rocky dangers with not more than 10 feet water upon them. The navigable part of the channel is about ½ mile wide and lies on the northern side of the entrance.

The Canary fishermen state that the wandering Moors, who belong to the tribe of Wadilims, rarely come to the extremity of the peninsula, but are found near its junction with the mainland. According to some authorities these Moors are of a barbarous disposition; the fishermen, however, describe them as "tame."

The estuary abounds in fish, which can be easily taken in the seine. Winged and other game are to be seen in large numbers on the peninsula. It need hardly be said that there is no fresh water supply. The country is one almost unbroken series of undulating sands over which a few shrubs are dotted.

The estuary of the Ouro is a splendid sheet of tranquil water in the prevailing NE. wind, and from the bar presents the appearance of a sea with high bluffs on the eastern side, and what seems a low sand island (the peninsula) with occasional bluffs of moderate height on the western.

Landing.—A landing place was found close to the northward of the above-mentioned sandy spit, in a cove which, although a heavy surf rolls across its entrance, affords good shelter to boats.

The bar had, in 1881, only 12 feet on it at low water springs; it is situated about 1¾ miles eastward of Durnford point and south of a long sandy spit projecting to the eastward from the peninsula; after crossing the bar the channel rapidly increases in depth and expands into a fine basin with a clean bottom, about 2 miles across from bank to bank, and 7 or 8 miles in length, before it again shallows.

The water on the western side (that of the peninsula) shoals very gradually, and at many points landing from a boat would be difficult. The surrounding land presented no objects from which a leading mark for the bar could be obtained; and it would not be safe for any vessel to attempt the entrance without a pilot or previously buoying it.

Anchorage.—It may be well for a vessel proceeding to the Ouro to keep on the line of soundings marked on the chart. Deception cliff is a noteworthy object and a good mark for vessels when at no great distance from the land.

The coast from Durnford point northward presents no good anchorage.

In anchoring near Durnford point it will be advisable not to approach the SW. corner of the peninsula within 1,200 yards, as a shoal with soundings of 9 to 15 feet extends southwestward of the point. All along the southern end of the peninsula the water is shoal for 600 to 800 yards, the deepening being very gradual. Breakers are visible 2 miles S. 30° E. (S. 11° E. mag.) of the point.

Good anchoring ground in 6 or 7 fathoms somewhat less than a mile from the extremity of the peninsula, can be reached by coming in on an easterly course which will lead clear of doubtful spots. This anchorage in the prevailing NE. wind has smooth water, and is frequented by fishing schooners from the Canary islands, which vessels also anchor in soundings out of sight of land south of the Ouro.

To anchor off between Durnford point and the spit, bring the former to bear N. 64° W. (N. 45° W. mag.) and Sandy point N. 49° E. (N. 68° E. mag.), and anchor in about 5 fathoms water. The spit can generally be

traced by the broken water and also the edge of the sunken reef, but caution is necessary as a strong current runs to the eastward on the flood.

At the bar the young tide occasionally makes strong eddies. The full influence of the tide is felt as far out as Durnford point; this should be remembered in making for the outer anchorage near that point.

Supplies.—Water has to be brought from the mainland opposite the fort. The garrison depends upon the Canary islands for the greater part of its supplies. A few sheep and gazelles can be obtained from the Moors.

Herne island is near the north extremity of this extensive basin, and lies 18 miles NE. of the bar; it is surrounded by banks which dry at low water and which seem to be connected with the banks at the mouth of the Ouro river; but whether this is really a river or merely the continuation of this singular opening has not yet been ascertained; scarcely any stream, however, was perceived to issue from its mouth, which was more than a mile wide.

Tides.—It is high water, full and change, in Ouro river at noon; springs rise 8 feet. Off the entrance the flood stream sets nearly east, and the ebb west, with a velocity of about 2 knots an hour. Inside the bar, the tidal stream runs at the rate of 2½ knots an hour. Over the bar and the shoals it sets with great velocity, and causes a high break, which affords an unerring beacon to the shoalest portions. There appear to be three or four of these sandy bars or ridges, thrown up by the action of the tidal streams; they extend nearly to Fisherman point, distant 8 mile S. 11° E. (S. 8° W. mag.) of Durnford point.

Angra de Cintra bay.—From Fisherman point the coast trends SW. by S. to latitude 23° 6′ N.; the northern 13 miles being cliffs, along the base of which, to the distance of 3 or 4 miles from the shore, extends a bank with 5 fathoms on its outer edge and 12 fathoms close to it. From the summit of the cliffs, white sandy downs with flat summits extend inland, one of which, at the distance of 8 or 9 miles from the southern termination of the cliffs, appearing somewhat elevated above the rest, and having its southern extremity peaked, is remarkable; it is a short distance from the beach in the bay of Angra de Cintra. From the north entrance point of this bay a reef extends southwestward about 3 miles, the point itself being low and sandy and almost level with the water. The south entrance point of the bay is in latitude 22° 58′ N., and from it also a reef projects a considerable distance to the northward. The break in the coast between these reefs, which forms the opening into the bay, is about 7 miles wide; and from the northern reef, the bay extends about 4 miles in a northern direction. Midway between the two reefs at the entrance there are only 4½ fathoms, sandy bottom; and a little further to the SE. of this position there is a detached shoal. The opening seems otherwise safe, there being 7, 8, and 9 fathoms in the rest of the space. The bay is apparently shallow,

but abounds with fish, as does the whole bank between the Ouro river and this bay. Great care is necessary when entering.

Fishery.—Fishing vessels belonging to the Canary islands are found in this vicinity; they salt and cure fish for the supply of those islands, and it is stated that at the foot of the high down above mentioned good water may be obtained by digging in the sand.

Rollers.—During the time of rollers, the sea breaks very heavily along this part of the coast, and in winter it breaks in several places across the opening into Angra de Cintra bay.

Cintra hills.—About 10 miles southeastward of Angra de Cintra bay, and a few miles inland, there are three or four small isolated sandy downs, named Cintra hills; they are rather higher than the adjacent ground, and may serve as a mark by which to find the bay, but can not be seen further than 10 or 15 miles.

St. Cyprian bay.—From Angra de Cintra bay the coast trends about SSW. for a distance of 21 miles; it is low near the shore, but gradually rises and becomes a continuous plain of white sand. The coast at a distance of 21 miles from Angra de Cintra bay trends SW. for 17 miles, presenting alternately cliffs and sandy beaches as far as St. Cyprian bay. The eastern point of this bay is a cliff 150 feet high, which has a circular form toward the sea and a flat summit somewhat resembling a fortification. It is bounded on the west side also by a steep cliff, which, after extending 2½ miles to the westward, turns abruptly to the southwestward, and forms cape Barbas.

Unsafe anchorage.—Baron de Roussin, who named St. Cyprian bay the bay of Tribulation, from the danger to which his vessels were exposed during the five days they were occupied in its examination, observes that being open from NNE. to west, it is unsheltered from the prevailing winds and the heavy swell that they roll in; and the anchorage, though on a bottom of sand and mud in 10 to 20 fathoms, offers very little security. No vessels should venture in except in cases of absolute necessity. The multitude of fish, however, which are found there attracts the Canary fishermen, who, with the hope of being quickly laden, and the appearance of moderate weather, frequently anchor too close in; where, if the wind suddenly freshens, they are equally incapable of beating out of the bay with their crazy vessels, or of riding out the gale with their ill-found ground tackle. They are, therefore, sure to drive and to be thrown upon the beach, where they are equally sure of being plundered, stripped, and thrown into slavery by the Moors. These Moors appear to be mere wanderers of the desert and to have no fixed habitation. They are said to be outcasts from the other tribes and to be scattered along the coast from cape Bojador to Senegal river.

Anchorage.—Anchorage has been found off cape Barbas in 19 fathoms, fine green sand, the cape bearing S. 4° W. (S. 23° W. mag.), distant 4 miles.

Coast.—From cape Barbas to Galha point, distant 9 miles, the coast is an uninterrupted cliff of about 80 feet in height; there is a depth of 12 fathoms at a mile off shore, and at a distance of 2 miles there are 17 fathoms, on a bottom of muddy sand and broken shell; the coast near Galha point is formed by the usual sandy plans with a few cliffs; southward of the point it recedes and forms a shallow bay full of reefs, with an outlying and dangerous rock off both its northern and southern entrance points.

Pedra de Galha rock.—The northernmost of these rocks is named Pedra de Galha, and it lies about 2 miles S. 82° W. (or N. 79° W. mag.) of Galha point; it is rather higher on the northern than on the southern side, and about ½ mile in circumference.

Virginie rock lies 2 miles off shore, and about 3 miles S. 4° W. (S. 23° W. mag.) of Pedra de Galha rock, of which it is about three times the size. These rocks are in some measure connected by a chain of flats which extend a mile northward of Pedra de Galha and ½ mile southward of Virginie rock. At a mile westward of these rocks, 18 fathoms will be found on muddy sand; and as the depth increases to the southward the bottom becomes harder.

Coast.—From Virginie rock cape Corveiro bears S. 12° W. (S. 31° W. mag.), distant 23 miles, and S. 9° W. (S. 28° W. mag.) 57 miles further is situated the shoulder of cape Blanco. The intermediate coast is moderately high and nearly straight, with but few trifling indentations. As far as cape Corveiro it is one continued stretch of white sand, rising in some places into peaked hills, in others gently sloping to the sea, with here and there a few cliffs, and the whole without the least appearance of vegetation.

Cape Corveiro.—At the south side of a sandy beach 5 or 6 miles long, at the head of a slight indentation named St. Ann bay, the irregular summit of one of these cliffs forms a striking contrast with the uniform smoothness of the adjoining coast. It is about 5 miles in length, and its most salient point, though not very well defined, is named cape Corveiro, the latitude of which is 21° 47′ N. A muddy bottom is found near the cape.

Shoal.—A shoal, upon which there is a wreck and upon which the sea breaks heavily, lies in the entrance of St. Ann bay about one mile off shore.

Current.—The strength of the current along the shore is nearly a knot an hour, but further seaward it is much less.

Coast.—Southward of cape Corveiro the coast consists of white and red sandy slopes, assuming various shapes, alternately terminating at the water's edge in broken cliffs or in low sandy beaches, on which there is a heavy surf. In running along the coast, at 25 miles northward of cape Blanco, Levrier bay is seen over the isthmus which connects that cape with the

mainland; and at 5 miles N. 36° W. (N. 17° W. mag.) from cape Blanco there is a high sandy shoulder projecting from the line of coast, which has often been mistaken for the cape, and is called False Cape Blanco.

Cape Blanco.—In latitude 20° 46′ 27″ N. and longitude 17° 5′ 40″ W. is a perpendicular white cliff, about 100 feet above the level of the sea, and its surface is quite barren. It presents a sea front of about ¼ mile long, which lies nearly east and west, with a beach extending to the eastward of the cliff for a distance of 200 yards, and which is so steep that at 50 yards from it there are 7 fathoms water. From the western extreme of the cape a shoal spit projects to the southwestward about ¼ mile, with 3 fathoms on its extremity and two detached shoals of 3½ and 4 fathoms extend 600 yards S. 4° W. (S. 23° W. mag.) of the spit.

Boundary.—Near False Cape Blanco the Spaniards have erected a flagstaff to indicate the southern limit of the territory claimed by them on the part of the coast.

West bay is formed by cape Blanco and the sandy shoulder (False Cape Blanco) 5 miles N. 36° W. (N. 17° W. mag.) from it. The shore consists of a broad beach of white sand interspersed with cliffs. Through one of these cliffs the sea has perforated a large hole, which may be seen at some distance, especially when approaching from the westward.

Anchorage.—The anchorage in West bay (as well as on the whole coast from cape Corveiro) is clean. Muddy sand is found throughout, with a depth from 12 to 19 fathoms at about a mile from the shore; and large vessels may proceed so far in as to be sheltered from a NW. wind.

There is fair anchorage in West bay in 5½ fathoms water, with a bluff about ½ mile eastward of False Cape Blanco, bearing N. 8° W. (N. 11° E. mag.)

Levrier bay.—The long promontory of cape Blanco forms the western side of the extensive bay of Levrier, which is 25 miles long from north to south, and nearly 20 miles wide at the entrance. The anchorage ground in this bay is much restricted by an extensive bank and detached shoals, which extend from the eastern side.

The western side of Levrier bay is indented by Repose bay and a small shoal bay, situated 7 miles northward of it, known as Star bay. The head of the bay is named Archimedes bay.

The coast on the eastern of Levrier bay is low, with a few sand hills upon it. It is fronted by a shoal bank, which to a depth of 3 fathoms extends generally about 3 miles from the coast with numerous offlying dangers, which in the southern part of the bay are found at 7 miles from the eastern shore.

Repose bay.—Cansado point, the south entrance point of Repose bay, is 4½ miles N. 12° E. (N. 31° E. mag.) of cape Blanco, and Flore point, its northern limit, is 4 miles further in nearly the same direction. The

bay, which is about 2 miles deep, has from 5 to 2 fathoms water in it, but affords very little shelter from NE. winds, which blow here with great violence and are loaded with minute sand, which is most injurious to the eyes. The *Ætna* rode very uneasily in this bay and parted one of her chain cables. Even with a light breeze there is a troublesome sea, and it did not appear that on the eastern side of cape Blanco there was any convenient anchorage.

Winds.—Repose bay is sheltered from NW. and NNW. winds, should they blow, but the Canary fishermen who frequent this anchorage assert that NNE. and NE. winds constantly prevail, and that those winds, and the sea therewith, are considerably heavier than is experienced when west of the cape, and therefore, though there is certainly anchorage in Levrier bay for vessels of any size, yet they are recommended to take up the outside anchorage in West bay, where the Canary fishermen resort in preference to that found to the eastward of the cape. In March, 1886, the *Sylvia* experienced in West bay strong winds from north to NE. from 10 a. m. to midnight; until 10 a. m. it was from NE. The wind was less in the day, increasing about sunset. There is less swell there, abundance of fish to be taken by the hook, and little chance of losing an anchor; also should a strong westerly breeze set in they will still have the option of going inside for shelter.

Levrier banks.—One of the great banks which obstruct the eastern side of Levrier bay approaches cape Blanco within 1½ miles eastward of the cape; it has only 2¼ fathoms on its edge, but there is a safe channel of 7 to 16 fathoms between it and the steep beach of the cape.

Directions.—To make cape Blanco run down the latitude of 20° 52′ N., on which parallel the shore may be approached to the depth of 15 fathoms in the thickest weather. When in that depth the land should be visible; the surf may be heard at a distance of 1½ miles from the shore. If the weather is very thick, anchor; but if the cape be seen, steer so as to pass it at a mile distant, in order to avoid the long spit, with 3 fathoms at its extremity, which runs off to the southwestward. When the eastern angle of the cliff, the upper part of which overhangs like an open mouth, comes fairly in sight, haul in toward the steep sandy beach; it may be given a berth of about 400 yards, but be careful not to approach it so near as 7 fathoms water; the depth of 12 fathoms is a prudent distance. Should the wind hang northeasterly, and a board to the eastward become necessary, tack in again as soon as there is sufficient room, and upon no consideration decrease the depth of water in standing to the eastward to 9 fathoms, as the next cast will probably be 2½ fathoms. With a foul wind it would be prudent to anchor outside and wait until the flood tide has made. A short board then will carry a vessel to the anchorage, which, with a flood tide running, should be taken as soon as the west point of the cape is well shut

in, and the eastern cliff again shows the appearance of an open mouth. The best anchorage will be in 10 or 12 fathoms, about $\frac{3}{4}$ mile NE. of the cape, but no mud will be found south of Cansado point, off which an advantageous berth may be taken in 8 fathoms. The anchorage is an uneasy one.

Working to windward.—To beat up to cape Blanco from the southward against the prevailing NE. winds, Commander Belcher recommends standing off on the starboard tack during the flood, and inshore with the ebb, because the ebb stream in the offing sets northerly, and when closing the land will be rather on the lee bow. Do not, however, stand in after the last quarter ebb, unless it be the intention to drop an anchor, for with light winds a dull sailing vessel will not stem the tide and current. Whenever cape Blanco can be brought to bear S. 87° E. (S. 68° E. mag.), stand boldly in toward the land, but if bound to the inner anchorage, do not attempt to round the cape against an ebb tide, for unless the breeze be strong from the westward, few vessels could get beyond the steep sandy beach. It is better under such circumstances to anchor on the west side of the cape.

Bayadere banks lie off the pitch of cape Blanco; they were not minutely examined, but seemed to be extensive, and though the least water found on them was $4\frac{1}{2}$ fathoms, yet heavy overfalls were plainly seen during the ebb tide. The directions given above for rounding the cape leads well clear of them to the northward.

Tides.—The tides about cape Blanco are irregular, and their direction is much influenced by the form of the land. It is high water full and change in Levrier bay at noon; springs rise 6 feet. East of and near the sandy point of the cape the current of the flood sets N. by E., and the ebb S. by W., with a velocity of $1\frac{1}{2}$ to $1\frac{3}{4}$ knots an hour. At 2 miles eastward, the streams run north and south; and at $1\frac{1}{2}$ miles southward of the cape, the flood ran ESE. and the ebb SW. at the rate of $2\frac{1}{2}$ knots an hour. Off the coast northward of the cape, the flood stream sets south, and the ebb north; and close inshore the stream is considerably weaker than at 3 miles distant from the land.

Currents.—Along the western coast of Arguin during the fine season the current sets constantly to the southward, and even during the rainy season the exceptions to this rule are rare. In July 1830 the wreck of the French frigate *La Meduse*, drifted 90 miles in thirteen days, and was found at 45 miles from the shore, nearly on the meridian of the place where she was lost.

Caution.—The depths in Levrier bay have considerably changed, especially near cape St. Ann. Caution must be used in navigating this bay, and great attention should be paid to the use of the lead.

Coast.—Cape St. Ann, lying ESE. $\frac{1}{4}$ E. of cape Blanco, distant 22 miles, is a low plateau about 25 feet high. The land in the vicinity is marshy.

From Cape St. Ann the coast extends about 10 miles to the southward and eastward, and at that distance forms cape Arguin, which is the dividing point between Levrier bay and Arguin bay, in which is Arguin island. The land in the vicinity is low.

Arguin Island, formerly an important Portuguese and Dutch trading post, is now abandoned; it is the easternmost and largest of a group of islands occupying the middle of the bay east of cape Arguin, and it is entirely surrounded by a bank of sand. One of the tanks of the island has been cleared of sand and can supply water for about 100 men. A French company for curing fish, etc., built a large storehouse on the island, but it has been abandoned.

Least depth.—A channel leads to the anchorage off the island of Arguin, with 14 feet at low water in it. Three beacons have been placed as follows: One at Saline point, the second at cape Arguin, and the third at the south point of Arguin island. Three buoys are also moored between Saline point and cape Arguin, and five other buoys in the channel southward of Arguin island. In February, 1890, the beacons and two of the buoys were gone.

The anchorage is in 23 feet of water, sand and mud bottom, at ½ to one mile eastward of the fort. The tide runs from 2½ to 3½ knots at springs.

The prevailing winds are from ESE. to NE. between September and April, during which period various kinds of fish are abundant.

Soundings.—The depths vary from 2½ fathoms to 6 fathoms at from 3 to 4 miles in the offing between Arguin island and Tider island.

Arguin bank.—The bank of Arguin may be described as a continuation of the broad shoal which occupies the eastern side of Levrier bay, and to extend from thence to the south of cape Mirik, a distance of about 90 miles, its extreme breadth being about 40 miles, and its western elbow lying in longitude 17° 10′ W. The bottom on this bank is apparently a flat and very hard sand, but generally covered with broken shells.

No vessel can approach Arguin bank to a less depth than 7 fathoms without risk, as at a very short distance to the eastward of this there is shoal water. The general direction of the edge of the bank to the northward of latitude 20° N. is S. by W., and to the southward of that parallel about SE. by S. to cape Mirik. No part of the edge of the bank has been seen dry, but close to the breakers, which occur in many places, there are but a few feet of water, and the shoals between them do not appear to carry more than 10 feet.

Soundings.—In approaching from seaward, when to the northward of 20° N., the soundings gradually decrease to the edge of the bank from about 30 miles to the westward, where 40 fathoms will be found. To the southward of this parallel the bottom becomes more uneven, and from the spot where *La Meduse* was wrecked, in 19° 53′ 42″ N. and 17° 1′ W., a

still great irregularity takes place in the depth. The nature of the bottom westward of the bank of Arguin observes a remarkable law, which will be of some service to navigators who are obliged to approach it. From the 7-fathom edge of the bank, out to the depth of 25 fathoms, and thus including a belt of more than 15 miles in breadth, the lead invariably brings up a mixture of sand and broken shell, and in proportion to the proximity of the bank shell prevail; beyond the depth of 25 fathoms and as far as that of 50 fathoms the bottom is entirely of white sand. Hence it is evident that by the soundings and by a rough observation for latitude a vessel may always know her distance from Arguin bank. For example, should a vessel in latitude 20° 20′ N. find 23 fathoms with sand and broken shell, it may safely be inferred that the dangerous edge of the bank is not more than 22 miles to the eastward, and likewise that cape Blanco bears about N. 40° E. (N. 59° E. mag.) distant 35 miles.

Caution.—To the northward of 20° 20′ N. this law is uniform, but to the southward of that parallel it is subject to some exceptions, and the best advice to give the seaman is to keep the lead going, and not to shoal the water to less than 25 fathoms; as the bank south of latitude 20° N. takes a direction of SE. by S., it becomes no longer dangerous if a vessel is kept on a wind in 20 to 25 fathoms, and sounds frequently. In any case, however, the mariner is recommended to pay strict attention to frequent sounding, as it is indispensable while in the neighborhood of this extensive and dangerous bank.

Commander Belcher seems to have some doubt of the strict uniformity of the remarkable and apparently useful law above quoted from M. de Roussin's work, but observes that, "Whether this remarkable distinction in the *quality* of the soundings be correct or not, the *depths* will be sure guides, and unless actually bound to cape Blanco no vessel has any business within 15 fathoms by day and 25 by night, especially to the southward of 20° N. Vessels in the vicinity of this bank should frequently feel for the bottom with 40 or 50 fathoms of line."

The *Ætna*, standing in towards the bank near the place where *La Meduse* was wrecked, suddenly shoaled to 7 fathoms; and in standing off found the depth decrease to 5 fathoms, which continued for a quarter of an hour, then it deepened to 16, and as suddenly no bottom was found with 100 fathoms. The current and tide probably set strongly on the bank, as subsequent experience proved they did, so that the vessel scarcely stemmed them, and thus accounted for the long detention in 5 fathoms.

Cape Mirik.—At 89 miles SSE. of cape Blanco, is cape Mirik; it is a very low sandy point near the southern termination of the great bank of Arguin. The intermediate coast, between the low sandy point forming the eastern limit of Arguin bay and cape Mirik, has only been partially examined; it is everywhere fronted by shoals and sand banks, which render all

approach difficult. At about 20 miles north of cape Mirik there is a group of islands near the shore, the most important of which is known as Tider island, lying 3 miles from the mainland, to which it is joined by sand spits extending from the north end; these uncover at low water.

St. John island is at the bottom of the gulf, of which cape Mirik forms the western extremity.

Tanit bay.—From cape Mirik the coast trends to SE. 27 miles, where it forms an angle, called Tanit bay; this bay is fronted by a bank which extends out 10 miles and appears to obstruct it. The depth on this bank varies between 16 and 20 feet; the bottom is composed chiefly of broken shell. Tanit bay affords no shelter. The intervening coast is low, and comprised of a chain of uniform sand downs, interspersed with small clumps of bushes. A few huts are seen in some places near to the beach, and in the dry season the wandering Moors assemble here to catch and dry fish. Two large sheets of water were observed between the high downs, but it is not known whether they are fresh or salt.

Angel hillocks.—From Tanit bay the general direction of the coast is S. by E. for a distance of 36 miles, some flat sand hills are seen which are rather higher than the rest of the coast, and have been named Angel hillocks. They are divided into two groups; the northernmost, which are smaller than the others, are studded with tufts of brushwood, while the eight or nine hummocks of the other group are nearly bare. Southward of Angel hillocks the shore gradually becomes lower till it sinks into a uniform line of sand scarcely above the level of the sea, with here and there a bush.

Wreck.—The wreck of a three-masted vessel, lost near Angel hillocks, is visible from seaward for a distance of more than 8 miles, and it will probably continue for some years to form a distinguishing mark for vessels navigating that part of the coast.

Caution.—No part of this coast from cape Mirik should be approached to a less depth than 8 fathoms; by attending to which rule all dangers will be avoided, and amongst others the Angel bank, a shoal flat which extends 7 miles from the beach, abreast of Angel hillocks. This flat affords, however, a convenient anchorage for small vessels.

Landmark.—At 12 miles southward of Angel hillocks, and a little within and higher than the beach, there is a stunted palm, the only one seen in the long interval of coast between cape Bojador and Senegal river.

Portendick.—About 2 miles southward of the above palm tree is the site of Portendick. The coast is a continuous line of sand, with a few hillocks and some scattered bushes, but all so low that nothing can be seen even in the clearest weather at a greater distance than 9 miles. No vestige remains of the former settlement, and the huts, which were hastily

constructed by the Moors, consisted of loose bushes only, and were not more than 4 feet high; they answer, however, the temporary purposes of the traders, who bring down gum, or of the fishermen, who find here an abundant harvest.

Roadstead.—The roadstead is west of a small projection of the beach, and between two banks of sand and shell, one mile apart, both lying in a NW. and SE. direction, with from 1¾ to 2¾ fathoms water on them. The northernmost or inner bank is 2 miles long, its south extreme bearing S. 26° W. (S. 45° W. mag.), distant 600 yards from the point near the landing place, where the Moors generally erect their huts, and there is a knoll of 10 feet, 200 yards S. 82° W. (N. 79° W. mag.) of the same point, with 3½ fathoms inside it. The northern extreme of this bank is reported to be considerably farther to the northward than is shown on the charts. About 1¼ miles S. 60° W. (S. 79° W. mag.) of the landing place on the projecting point of beach lies the north extreme of the outer bank, which extends from thence SE. for about 2 miles. The depths in the roadstead are from 3¾ to 4¾ fathoms on sand and shell, and vessels may anchor where most convenient, according to circumstances; vessels taking in cargo can anchor in 4 fathoms at about ¼ mile southward of the huts and 400 yards southward of the northern bank.

Directions.—Vessels bound to Portendick should sight the Angel hillocks, and follow along the coast, keeping in not less than 6 fathoms, and anchor SW. of the north bank, on the parallel of the point in 4½ to 5 fathoms. The landing is on the shore of the little bay formed by the point, and should be approached round the south side of the north bank. Commander F. W. Richards remarks: "A vessel wishing to make Portendick, should anchor in 6 fathoms, if not sure of her latitude. The palm tree, which is old, should be made out before the bank is neared too closely. There is a knoll rather higher than the rest of the coast in the center of the little bay, where the anchorage is, which might catch the eye when approaching; steering for this knoll, bearing S. 81° E. (S. 62° E. mag.), we did not find less than 4¼ fathoms to within 300 yards of the shore. The coast is so low about Portendick that it can not be distinguished in 7 fathoms."

There is good anchorage in 4½ to 5 fathoms 4 miles from the beach, the Angel hillocks bearing N. 34° E. (N. 53° E. mag.).

Tides.—It is high water, full and change, off Portendick at 10h. Springs rise 6 feet. The general current sets to south, but it is not strong.

Caution.—Vessels detained at the anchorage of Portendick or on any other part of this coast should lie in not less than 10 fathoms depth, on account of the violent rollers which occasionally set in. Sometimes the sea breaks in 4¼ and even 9 fathoms depth; this frequently occurs at the anchorage of Guet N'dar, near to the bar of the Senegal, and has caused

the loss of vessels anchored in shallow water which could not gain an offing. When these rollers are expected, vessels anchored in shallow water should get off shore, even if it is necessary to resort to kedging.

Coast.—From Portendick the general trend of the coast is S. by W., for about 100 miles to the northernmost of the Marigots, or little channels, which carry off the overflowings of Senegal river in the rainy season; this channel is named the Mosquito Marigot. The whole of the coast between Portendick and Mosquito Marigot is low, nearly level, and interspersed with small bushes. Two patches, however, may be perceived of red sand partly covered with brushwood, but they are only discernible when within 2 miles of the beach; one is in latitude 17° 25′ N., the other in 16° 55′ N. From the masthead some sheets of water were observed at the foot of these elevated patches, and at 6 miles southward of them the interior appears to be partially clothed with brushwood, but the coast remains uniformly barren.

Green mud commences between 2 and 3 miles from the coast, 16 miles north of St. Louis. This character of the bottom is due to the deposits from the river when the bar was north of its present position, and is remarkable from the fact that it is found only 15 miles on each side of the parallel of 16° N. Abreast of St. Louis green mud is found as far as 14 or 15 miles off shore, but it generally lies inside of 8 or 10 miles.

Whenever the soundings show a bottom of pure green mud, it indicates a position near the parallel of St. Louis; on the edges of this mud flat there are spots of green mud mixed with sand and broken shell, sometimes with gravel, but most often the bottom is of brown muddy sand. The mud generally becomes pure as the coast is approached; it is more compact and less mixed with other substances in the north than it is in the southern part of the bank. Within 5½ fathoms depth, abreast of St. Louis and near the shore, the bottom becomes fine sand, sand and shell, sand and gravel, covered with green mud; on the parallel of Guet N'dar and to the southward there are several rocky patches which should be carefully avoided when taken an anchorage. The holding ground is much better on the mud bottom than it is nearer the coast, where there is more or less sand.

Mosquito Marigot.—Mosquito Marigot is about 36 miles northward of St. Louis. When the rains have swollen Senegal river, the bank at the entrance of this Marigot is covered and may be crossed by boats, but always through a heavy surf.

Senegal river.—To the southward of Mosquito Marigot the basin of the Senegal is only separated from the ocean by a narrow tongue of sand, which gradually decreases in height towards its southern extremity, and is named Côte de Barbarie. Within this tongue of sand the divided stream of the Senegal forms a number of small islands, on which a covering of bushes gives the country some appearance of fertility.

Small steamers, during the rains, can ascend the Senegal river as far as Medine, or the first cataract.

Senegal islands.—The names of these islands are Bequio, Gazelles, Bifeche, Griel, and Thiong, which last is connected with the island on which the town of St. Louis is built. Griel island, or, as it is locally termed, le Bois de Griel, contains some trees, the verdure of which offers a singular contrast to the 600 miles of desert northward of them. On either side of this green tuft the stream of the river may be seen from the masthead over the sandy ridge; and it is the surest mark for indicating the landing place to the northward of the bar. Along this part of the coast vessels may run at the distance of 2 miles from the beach, in from 12 to 8 fathoms, over a clear bottom of compact green mud.

St. Louis.—Southward of Île de Thiong will be seen the French establishment of St. Louis with its white buildings. There is a dock yard at the north end of the isle of St. Louis. The narrow island on which the town stands is little more than a mile in length, and is connected to Île de Sor by a bridge of boats 660 yards long; the principal passage is on its eastern side, and the western channel is so narrow and its western bank so low that from the offing the town appears to stand on the seashore.

A railway connects St. Louis with Dakar, a distance of 150 miles. There is also telegraphic communication with Tenerife and Bathurst, viâ Gorée.

Population.—The population of St. Louis in 1872 was 15,650.

Supplies.—At St. Louis water, wood, beef, mutton, and poultry may be procured of fair quality and at reasonable prices.

Coal.—There are about 10,000 tons in stock at the beginning of June, but no coal is imported between June and November.

Climate.—The temperature ranges between 52° (about the mean minimum in January) to a maximum of 95° in the summer months.

During the prevalence of easterly winds in the dry season a difference of 36° is often experienced between the night and day temperatures.

In the dry season the river subsides greatly and the climate is very unhealthy.

Light.—There is a small fixed light shown from the government house on Île de St. Louis, visible 6 miles. From a signal staff at the same place the depth of water on the bar is signalled.

Guet N'dar.—To the westward of St. Louis stands the village of Guet N'dar, defended by a battery. A canoe is immediately launched from the village on the approach of a vessel.

Anchorage.—The anchorage off the bar of Senegal river should be taken, according to the time of the year, in 9 or 11 fathoms, or in other words, at 2 or 5 miles from the bar. At all seasons a long swell prevails at this anchorage. Vessels also anchor abreast Guet N'dar in 9 to 10

fathoms, mud, about 2 miles from the shore, with the government house at St. Louis bearing about S. 65° E. (S. 45° E. mag.).

Good anchorage will be found outside the bar with St. Louis lighthouse bearing N. 22° E. (N. 42° E. mag.); the pilot's semaphore N. 45° E. (N. 65° E. mag.), and the village of Mouit S. 54° E. (S. 34° E. mag.).

Approaching from northward.—The mouth of Senegal river is not easily recognized when coming from the northward; the heavy surf which prevails upon the whole coast, and which breaks along Côte de Barbarie, prevents the surf on the bar from being distinguished, and vessels might pass without seeing it if they should keep at too great a distance from the shore. But from abreast of Guet N'dar they may safely run along it at the offing of a mile, and at that distance everything will be distinct. The cocoanut trees and square guardhouse on Île de Babagué will be seen in passing. As the wind generally hangs to the northward, it is advisable to take a berth well northward of the bar for the greater facility of communication with the shore.

The sand hills north of St. Louis are rather higher than those to the southward, and at about 8½ miles north of St. Louis there is a village easily recognized by two or three large warehouses with red roofs.

Approaching from the southward.—In running for the Senegal from the southward, the mouth of the river is more easily perceived than from the northward, as it opens in that direction. At the distance of 35 miles south of St. Louis, and on the parallel of 15° 26′ N., there is a large red sandy elevation (Tiakhmat) visible about 15 miles, which to vessels ignorant of their latitude may serve to indicate their distance to the southward of the bar; when near the shore three palm trees may be seen near this sand hill.

Gandiolle telegraph station (Marché de Gandiolle), 8½ miles south of St. Louis, is also rendered conspicious by a house with red roof and white gables.

At about 12 miles south of St. Louis are the five sand hills of Mousseguiob (Dunes de Mousseguiob), which are from 16 to 30 feet high, and on one of which there is a flagstaff.

Bar.—The position of the Senegal bar is not stationary; the right bank of the Senegal below St. Louis is so low as to cover with very high tides, which sometimes act so violently as to open new channels.

In November, 1881, the bar of Senegal river was reported to have shifted 2 miles to the southward, the entrance to the river being then situated in latitude 15° 51′ N.

In December, 1882, the depth on the bar was 9½ feet at spring tides, and a vessel drawing 6 feet bumped heavily when crossing it.

In 1884 vessels of 8 feet draft crossed the bar.

River.—The river is lowest in June and highest in September, the difference of level (at St. Louis) being 4 feet; from July to November steamers can ascend Senegal river to Medine, a distance of 495 miles, and at all seasons vessels drawing 10 feet can proceed to Mafou, a distance of 176 miles from the bar.

The navigation of the river as far as Podor (141 miles above St. Louis) is always easy, and beyond that station, although more difficult, it presents no serious obstacles except at Kippes passage, 2 miles below Medine, where the current at times forms a rapid.

Directions.—In the rainy season, and even up to March, the great volume of water which is poured out of the river frequently renders the bar impracticable even to decked boats. The waves of surf produced by the impetuosity of the stream meeting the ocean swell are so prodigious and succeed each other so rapidly that it is impossible to find a quiet interval; and it is not uncommon on these occasions for the sea to break in 7 fathoms at a mile outside the bar. From April to the end of September the bar is almost always passable by decked boats and sometimes by open boats, but it is advisable that they should be managed by natives.

Vessels drawing more than 10 feet can not cross the bar, and none should be employed in trading with this place which are too large to enter the port, as the employment of lighters is expensive and tedious; a steamer to trade with advantage should not draw more than 8½ feet. Once fairly in the river, from 7 to 5 fathoms will be found, and with the assistance of the tide, a pilot will speedily beat a sailing vessel up to St. Louis.

Signals.—The services of a steam tug can now be secured in crossing the bar; the signals shown from the pilots station are as follows:

Yellow flag ---------- Bar is practicable.
Blue flag ---------- Bar is impracticable.
Yellow and blue flag ---------- Pilots are on the bar and vessel can approach.

Tides.—It is high water, full and change, at Guet N'dar and Senegal bar at 8h. 42m., and at St. Louis at 10h. Springs at each place rise 6½ feet.

From February until May the tidal stream is felt as far as Djouldé-diabé, 228 miles from St. Louis, the ebb stream being more rapid and continuing longer than the flood.

During the period of floods, the downward current attains a volocity of about 2 knots an hour at Podor and 4 knots an hour at Medine.

Currents.—The general and almost constant direction of the current is along the coast from north to south, as far as the mouth of the Senegal. Abreast of this river and for a space of several miles to seaward the powerful tides, both in and out, affect the general uniformity of the southerly current, and are often so strong as to bring vessels, anchored in the outer road, with

their broadsides to the wind in the strongest breezes. These out tides have no very regular set; the flood stream, however, generally runs NE., and the ebb SW.

Winds.—The winds are not dangerous to vessels navigating along this coast, nor to those at anchor off St. Louis. The prevailing wind, during the greater part of the year, is from ENE. to NNW. Tornadoes occur in the winter season, but blow off shore from the east or ESE. The SW. winds, which follow them, are never strong, and the anchorage is easily regained in case of having been driven off by the tornadoes. There are occasionally strong westerly winds from June to September, which are the only ones to be feared, but they are of short duration. The following appears to be the general character of the winds: In November, ENE. winds commence to blow in the morning, and are replaced, almost without intermission, by those from NNW.; they gradually increase each day in force and duration until January, when they blow all day. At the end of January they lose their force, and by March they cease entirely, while the wind from the offing becomes gradually stronger and, in turn, continues to blow during the whole day, from the beginning of April to the end of May. This latter wind gives way to that from WNW., west, and sometimes even SW. which blows chiefly in the afternoon during July, August, and September, and returns to NNW. in October. The heaviest rain falls between the middle of June and the end of September, and is generally accompanied by squalls of wind. Sea breezes are regularly experienced during the dry season.

Coast.—The western point of cape Verde bears from the bar of the Senegal river S. 39° W. (S. 59° W. mag.), distant 87 miles, and the intervening curve is about 11 miles in depth.

For about 10 miles southward of Senegal river the coast is as low as that to the northward; and though it then becomes rather higher, it preserves throughout the same uniform appearance of a chain of white sand hills, with scattered brushwood and here and there a few dwarf trees, until the monotony of appearance is broken by the four red sand hills locally known as Tund or Méléye. The anchorage off these sand hills is named Kelere roads.

Little paps.—To the southward of these sand hills the coast does not present anything remarkable as far as the Little paps, the northernmost of which is in latitude 14° 56′ N.; they are the two highest sand hills to be seen between Senegal river and the paps of cape Verde. They rise from the beach, and are easily known by a slight undulation on their summit, and by three or four small hills to the southward; they are of dark color, and visible at the distance of 12 or 15 miles.

There are several villages along the coast between Senegal river and cape Verde, the principal of which are Kelere, Mboro, and Cayar; at Mboro the vegetation, being unusally thick, is conspicuous. Landing can generally be easily effected at Cayar.

Soundings.—From Senegal river as far as the parallel of 15° 20′ N., at 2 or 3 miles from the coast, the bottom is of mud, in 11 to 27 fathoms; and from thence to the southward the depth rapidly increases, as at 6 miles west of the Little paps there are from 57 to 62 fathoms. The same bottom continues, and is so soft that the lead sinks in it, offering good anchorage to any vessel obliged to come to in consequence of calms.

Yof bay.—The indentation of the coast between Cayar and Almadi point is named Yof bay; Yof is also the name of a rocky islet which is connected with the beach by a submerged reef and of a village on the peninsula of cape Verde. The coast rises gradually from the Little paps as far as the Great paps, which crown the peninsula. The bay of Yof is dangerous for sailing vessels to get into without a breeze, and particularly when the rollers are setting in; the depth of water is very great, and the current sets into the bay and toward the beach. This current has caused the loss of many vessels bound from the Senegal to Gorée, which have not been kept far enough to the westward to allow for the set of the current.

Cape Verde paps.—Little paps bear about N. 59° E. (N. 79° E. mag.) from the paps of cape Verde distant 27 miles. In fine clear weather both may be seen at the same time, as the Cape Verde paps are visible 20 or 25 miles. At that distance east of the cape the coast begins to rise and to show more wood, the country about cape Verde being covered with trees, amongst which there are several of considerable height. The bank of soundings here is steep, and all this coast may be approached to a very short distance.

Cape Verde, the westernmost point of Africa, is the extremity of a peninsula forming the west side of Gorèe bay, and is moderately high land, rising gradually to the two paps, the southwestern face of which is nearly perpindicular, and is usually mistaken for cape Verde when seen from a distance. The cape itself terminates in low land on which are some detached hillocks, and which might be taken for islets when seen from a distance.

Semaphore.—A semaphore station in telegraphic communication with Dakar, and with which vessels may communicate, has been established on the western mound.

Light.—A lighthouse stands on the western mound of cape Verde; it is a white conical building, 66 feet high, and exhibits from an elevation of 371 feet above the sea a white light, which revolves every half minute, and should be seen in clear weather from a distance of 27 miles.

Almadi ledge.—From Almadi point a reef of black rocks named Almadi ledge, extends a mile, and is mostly awash, but in two or three places some of the rocks rise 8 or 10 feet above the sea. The westernmost of them has the form of a cube, and stands in latitude 14° 44′ 30″ N. At 3 miles north of this rock there are 71 fathoms, mud and sand; at a mile west of it there are 31 fathoms, shell; and though there is less water

south of it, vessels may everywhere approach the ledge within a mile, making allowance for a probable inset of the current. It is said that there are one or two openings through the ledge.

Currents.—The prevailing currents between the Senegal river and cape Verde follow the direction of the coast to the southward in the same manner as those already mentioned, but near the shore at cape Verde the tidal streams are very appreciable, the flood dividing into two branches, one setting to the northward, the other setting toward Almadi point; the flood stream occasions strong and irregular currents in Yof bay. The ebb stream sets off shore.

Light.—The lighthouse on Almadi point is a square tower 39 feet high, rising from the center of the keeper's dwelling, and painted white. It exhibits a fixed red light, elevated 85 feet above the sea, and should be seen in clear weather from a distance of 8 miles. The lighthouse is built on the western side of the point; from it Cape Verde lighthouse is distant 2 miles, and the extremity of Almadi ledge to the westward is distant one mile.

Cape Manuel (Boniul).—From Almadi ledge, cape Manuel bears about S. 51° E. (S. 31° E. mag.), distant 8 miles. The intervening shore is high, covered with trees, and generally terminates at the seaside in basaltic cliffs or rocks. In a few places the cliffs descend into small bays, with beaches of white sand. The cape is high, covered with thick brushwood, and steep-to on its south side, but at the distance of 200 yards northwestward of its south extreme, and close to the beach, there is a small rock above water.

Light.—The white square tower on cape Manuel, the SE. extreme of cape Verde, is 39 feet high, and exhibits from an elevation of 171 feet above the sea a fixed red light, which in clear weather should be seen from a distance of 8 miles. The lighthouse is built on the cliff.

NOTE.—The red lights exhibited on Almadi point and cape Manuel, were reported in December, 1886, as very indistinct, and appearing almost white in color.

Madeleine islands.—Two miles westward from cape Manuel, and a little more than half that distance from the coast, there is a group of four rocky islands named the Madeleines. The largest is shaped like a crescent open to the westward, and is about 600 yards in length. It consists of a hard red rock with some basalt, and is destitute of any vegetation, though it appears that formerly a few baobab trees grew in its crevices. On the north side there is a very small creek which affords a landing place. The sea breaks with great violence over the three smaller islands, and through the channel between them and the largest, in which there are 3 fathoms.

In approaching these islands from cape Verde the soundings vary from 30 to 17 fathoms.

Madeleine channel.—There is a depth of 4 to 4½ fathoms in mid-channel between Madeleine islands and the main; steamers of 12 feet draft will save fuel by using it, but no attempt should be made to beat through.

Bernard bay.—The extremity of Dakar peninsula, 1½ miles northward of cape Manuel, is known as Bernard point, a low rugged projection, fronted with dark rocks, against which the sea usually breaks with considerable force. The intervening coast forms a bay, the shores of which are a series of rugged, rocky points, separated by small sand beaches. The depth of water within the limits of the bay varies between 6 fathoms and 10 feet, the points and beaches being generally steep-to. The bottom is generally of sand and shell, except in the vicinity of Dakar, where it is rocky.

Gorée bay.—The extensive bay of Gorée, with the island of that name, immediately opens on rounding cape Manuel; and as the water is everywhere deep, vessels bound to the island, which bears N. 62° E. (N. 82° E. mag.), distant 2¼ miles from the cape, may steer for it direct, if the wind permit.

The channel between Gorée island and Dakar point is seldom used by sailing vessels when entering the bay, as a strong current setting to the southward prevails in it.

Gorée island is ½ mile in length and 450 yards in breadth, lying about north and south. It is of volcanic formation, similar to that of the Madeleine islands and cape Manuel. The southern portion, which is 144 feet above the level of the sea, is the highest, and the rest of the island lowers to the north point. A shoal bank, on the outer edge at which there is a depth of 1½ and 2 fathoms, extends along the western side of Gorée island for a distance of 300 yards from the shore.

Gorée is the head station for the French fleet on the South African coast. It is a free port. The landing place is on the NE. side.

Caution.—Boats landing at Gorée island should always have an anchor and cable ready to veer in with.

Population.—The population of Gorée island is about 2,800.

Supplies.—Water is scanty, and the quality bad, the chief supply for the inhabitants is brought from the village of Hann on the mainland, as well as their fuel. Several large stores have been built on Gorée island, from which suplies of European produce can be obtained. The bay abounds with fish, and the seine may be used in Hann road.

Coal.—A hulk capable of holding 3,500 tons of coal is moored in Gorée road.

Gorée road.—The roadstead is situated northeastward of Gorée island; it is sheltered from all winds from SW. through north to east, and is perfectly safe during eight months of the year, that is from November to June inclusive; but during the rainy season squalls from the southeastward are

dangerous. The best anchorage for large vessels in either season is at the distance of ¾ mile NE. of the landing place on Gorée island, with cape Manuel open westward of the island, where they will find 9 or 10 fathoms on stiff clay, and from whence they can conveniently get under weigh with the wind from any quarter. To reach this anchorage in the fine season, when the prevailing winds are from NE. to NW., it is necessary to haul close round cape Manuel and the south extreme of Gorée island, and keeping by the wind on the port tack, with the lead going, to stand on till within a mile of the shore on the eastern side of the bay, and tacking there in 9 or at least in 7 fathoms. If not able then to fetch the road, make short boards along that shore, as the southerly current is strong there, and sometimes even a northerly eddy will be found.

Mooring.—A vessel intending to remain any considerable time at this anchorage should moor NE. and SW., so that the eastern cable may be veered to bring an equal strain on both in the heaviest squalls.

Venus bank.—A bank about 600 yards long and 300 yards broad, with 4¼ fathoms on it, lies N. 81° E. (S. 79° E. mag.) from the south extreme of Gorée island, distant 4½ miles, and about 2 miles from the shore on the eastern side of Gorée road.

Resolute shoal.—This shoal lies about 4 miles westward of Rufiskwe village and about 1½ miles from the shore; it has over it a least depth of 9 feet, and must be carefully avoided by vessels beating into Gorée road.

Tides.—It is high water, full and change, at Gorée island at 8h. 8m.; spring rise 5 feet.

Tornadoes.—In the tornado season, from the berth recommended, if the quality of the ground tackle be suspected, a vessel may easily run out of the road; for which purpose it will be prudent to veer away nearly to the end of the cable so as to be able to slip when everything is ready and before the weight of the squall comes, accompanied, as it generally is, with a deluge of thick rain, neither of which would be favorable to the expertness requisite on such an occasion. Having slipped, give the north extreme of the island a convenient berth, and when to the westward of this point, whatever may be the violence of the squall (which is generally from SE. by E. or ESE.), the island will afford sufficient shelter to enable the vessel to keep the wind nearly abeam till abreast the south extreme. Having reached thus far, bear up nearly four points to S. 62° W. (S. 82° W. mag.) and pass cape Manuel. From thence the sea is open and there is nothing to avoid but the Madeleine islands and Almadi ledge off cape Verde.

Dakar.—Dakar point lies about 1½ miles northward of cape Manuel and about 1¼ miles westward of Gorée island; the long low point of Belair, on which there is a baobab tree, lies N. 8° E. (N. 28° E. mag.) of Dakar point, distant 2 miles, and the town of Dakar stands in the southern part of the intermediate bay; it is the central point of French commerce with the Afri-

can coast. At Dakar point two jetties have been built, forming a double basin, affording shelter to the largest class of vessels and ample facilities for coaling.

Foreign men-of-war anchor outside.

A railway extends from Dakar to St. Louis and to the southeastward as far as Rufiskwe; it is proposed to extend it to Fatick, a town some miles up the Salum river.

The United States is represented by a consul and vice consul.

Signals.—When the bar at St. Louis is practicable a diagonal red-and-white flag is hoisted at the signal staff at Dakar at the Commandant's quarters, and a black flag when the bar is impassable.

Lights.—On the east pier of Dakar harbor is exhibited a fixed green light, visible in clear weather from a distance of 5 or 6 miles. The light is elevated 30 feet above the sea, 25 feet above the jetty, and is shown from an iron ladder attached to a cabin painted white. On the inner jetty a fixed red lantern light is shown.

Anchorage.—No heavy sea gets up in the anchorage off Dakar during tornadoes; it may be considered secure at all seasons.

Moorings.—The extremity of the eastern mole can be rounded close to, and under its shelter several sets of moorings have been laid down. There is a packet buoy for large vessels to make fast to and swing round in $3\frac{3}{4}$ fathoms.

Supplies.—Water is plentiful and good; at the north extreme of Dakar harbor is a large reservoir with pipes leading over a small jetty into the sea, so that a boat can be rapidly filled. In May, 1884, there was no water to be had.

Provisions are at times good, and fish is abundant.

There is no dockyard or factory at Dakar. English money is not in circulation, and is generally refused.

Coal is brought alongside in bags by lighters containing from 35 to 45 tons each; small vessels go alongside the jetty. If possible a few days' notice is required. Upwards of 10,000 tons are usually kept in store. A hulk, capable of holding 3,500 tons of coal, is moored in Gorée road.

Communication.—The steam packets of the Messageries Maritime company call at Dakar twice a month. A line of mail steam packets call on alternate Saturdays from and to Liverpool.

Telegraph.—There is telegraphic communication with St. Louis and Bathurst; also with the semaphore on cape Verde.

Population.—The population of Dakar is about 3,000.

Yellow fever seems to be epidemic every three or four years. There was a severe outbreak 1878 and again in 1881.

Climate.—The rains begin at Dakar in June or July, and last until the middle of December, during which period twelve to fifteen very heavy falls

of rain occur. Tornadoes nearly always happen in July, blowing their fiercest for about twenty minutes. Their direction is nearly always from the eastward.

Hann bay.—The coast of Hann bay recedes from Belair point, and the watering place is about a mile NW. of it.

Anchorage.—The anchorage in Hann bay is about a mile from the watering place, in 21 feet, or nearer in, according to the vessel's draft.

Belair shoal.—At nearly a mile eastward of Belair point, and distant 2 miles from the north extreme of Gorée island, there is a shoal of about 800 yards in length, within a depth of 3 fathoms, lying nearly east and west, and carrying only 7 feet water on it.

Directions.—Vessels proceeding from Gorée road to the watering place in Hann road must avoid Belair shoal by passing eastward of it in 5 fathoms, at 1½ miles from Belair point, or between it and that point, at ½ mile from the latter, in 3¾ fathoms, taking care to avoid the shoal water which extends S. 54° E. (S. 34° E. mag.) 800 yards from the point.

Clearing mark.—Bernard point, well open east of Dakar point, bearing S. 36° W. (S. 56° W. mag.) leads 800 yards southeastward of Belair shoal; and the eastern hummock of cape Verde bearing N. 82° W. (N. 62° W. mag.) leads 800 yards north of it.

Fortifications.—The old citadel on Gorée island; a circular tower on the north extreme of the island, mounting twelve guns; and on the west side is a small battery to mount two or three guns.

On Dakar and Belair points are earth works capable of mounting ten guns. The forts are old and obsolete.

Current.—Off cape Manuel the current separates into two branches; one sets toward Red cape, the other takes an easterly direction, passes south of Gorée island, sets over toward the eastern side of the bay, turns northward and westward, and following the trend of the shore flows back into itself through the channel between Gorée island and Dakar point.

Rufiskwe village, built east of a point lying east, distant 8 miles from Belair point, is rendered conspicuous by square white tower, visible from a distance of 8 or 9 miles.

A reef of rocks forms a small bay to the eastward of the point, which is much frequented by coasting vessels.

Several factories have been built on the east side of the tower from one of which a pier extends.

A reef above water lies S. 78° W. (N. 82° W. mag.) of Rufiskwe point, distant 1,200 yards. It is 400 yards from the shore.

Light.—A fixed red light, elevated 52 feet above the sea, visible in clear weather from a distance of 3 miles, is exhibited from the tower situated westward of Rufiskwe.

Coast.—From Gorée road the coast rises a little at some miles inland from the low white sandy strand. In advancing to the southeastward the sand hills progressively rise, and are covered with trees as far as cape Naze, which lies 20 miles from cape Manuel.

Red cape, lying S. 82° E. (S. 62° E. mag.) of Gorée island distant 14 miles, is the northern of three projections which are the prominent features of this part of the coast; it is tolerably high and of a reddish color.

The middle projection is known as Tubab Guialao, and is somewhat similar in appearance to Red cape, but not so high; it lies about 2 miles south of that cape. A group of rocks extends about 100 yards from the shore at its base.

Between Rufiskwe and Red cape are the villages of Bargney and Hyenne, or Yen, the position of the former being marked by some dark rocks on the beach, and the latter being built on a slight eminence and fronted by a bank on which there is about 4 fathoms of water.

Cape Naze, a remarkable looking cliff of yellow and reddish color, is the southern of these three projections; it terminates in cliffs of about 1,200 feet in height, the woody summit of which may be seen at a distance of 20 to 25 miles in fine weather; in the space between it and Hann road several negro villages will be seen, which are frequented by the coasting vessels of Gorée, who trade with them for stock; at 2 miles from this shore a depth of from 7 to 13 fathoms may be obtained.

Cape Naze is bold-to, and when approaching from the northward the land south of it appears as a low point covered with trees.

Gombaru point lies 3 miles from cape Naze; it is a low point terminating in a sand bank with some offlying rocks; a village stands on the coast near the point. From about 2 miles south of Gombaru point the extensive series of banks commence which front the shore as far as the entrance to the Gambia river.

Portudal is 3 miles from Gombaru point. This village has a bank lying off it about a mile wide, which in some parts nearly dries at low water, but there are 3 fathoms between it and the shore reef, 4 fathoms close to its west side, and 9 fathoms 4½ miles west of it.

A square white tower, built for the accommodation of the French garrison, is a conspicuous object at Portudal.

Anchorage.—Small vessels anchor off Portudal in 4½ fathoms, with the largest cluster of houses bearing N. 47° E. (N. 67° E. mag.); those of larger draft anchor in 6 fathoms, with the same houses bearing N. 59° E. (N. 79° E. mag.).

Serin point.—From Gombaru point to Serin point, which is low and marked by a village upon it with a conspicuous house, the bearing and distance are S. 40° E. (S. 20° E. mag.) 15 miles, the coast receding a little, with some villages built upon it, and in front of them are rocky shoals,

while shallow irregular soundings are found at a distance of 3 or 4 miles from the shore.

Amboru bank.—The flat and foul ground between Portudal and Serin point is connected with Amboru bank, which projects nearly 7 miles from Serin point. The bank is formed by two plateaus of rocks, separated by a channel, running east and west, 2 miles in width, and from 20 to 23 feet in depth. The northern plateau, on which the depth is 16 feet, is on the parallel of the village of Warrang. The southern plateau, which is the largest and most dangerous, is very crooked, and curves to the eastward from the SW. extremity, which is a wash. The sea breaks, during bad weather, on other parts of the bank, and at all times undergoes a remarkable change of color. On the northern part of the largest plateau there is 9 to 13 feet of water, bottom of sand, mixed with reddish pebbles, and in some places it is rocky. The depth close to the rocks on the southern part is 6 feet; the bottom is similar to that found on the northern part. The depth decreases abruptly from 4 or 5 fathoms to 13 feet all round the edges. The channel between it and the coast, sometimes used by coasters, should not be attempted by any other vessels, unless in case of pressing necessity, for the edges of the banks are difficult to recognize, and, during the prevalence of rollers or a fresh wind from the offing, the sea will be found breaking in all directions, even in the middle of the channel. There are no marks on the coast by which the position may be verified. Many vessels have been lost on this bank, and the mariner is recommended not to approach the coast in this vicinity in less than 9 fathoms of water, which is the depth 2 miles outside of the western edge of the bank.

Tides.—It is high water, full and change, on Amboru bank about 8h. 15m.; springs rise 6 feet.

Joal, or Gukwe, point.—At a distance of 7 miles SE. by S. from Serin point lies Joal point, the coast between forming a shoal bay, from the shores of which shallow banks extend nearly 3 miles; outside of them, however, and southward of Amboru bank, the water shoals regularly up to the line of 5 fathoms.

The French mission establishment of St. Joseph is situated about one mile north of Joal point, the buildings at the village are conspicuous for a long distance.

Joal village is situated on the banks of a river of the same name. It is rendered conspicuous from seaward by a chapel and square tower near the beach, which are visible for a distance of 7 or 8 miles.

Fajodj river.—At 4 miles SE. of Joal point there is an inconsiderable stream, named the Fajodj, the bar of which at low water is almost dry, and at high water is only passable by canoes and vessels under 6 feet draft.

Palmerin point.—At nearly 5 miles south of the Fajodj river there is a slight projection of the land, with a clump of trees upon it, named Palmerin point, with a reef extending from it 2 miles to the westward.

Joal patches.—Between Joal point and Palmerin point there are several shoal places on the bank which extends from the shore, of which some are dry at low water; these shoals are known as Joal patches.

Joal flat.—Between Fajodj river and Palmerin point a bank with less than 6 feet on it, known as Joal flat, extends a considerable distance from the shore.

All this portion of the coast should be navigated with great attention paid to the soundings, and by keeping in 7 fathoms a vessel will not be nearer than 2 miles to any danger.

Punshavel point.—A straight uninteresting coast, with a broad sandy beach, and the country island covered with trees or brushwood, extends for 15 miles in a southerly direction from Palmerin point to Punshavel point, a long narrow spit, the northern limit of the great estuary which leads into the Gambia river.

Soundings.—The coast between cape Verde and Gambia river should not be approached in hazy weather under 7 fathoms by vessels of large size. On the meridian of cape Verde and at 27 miles west of Gombaru point the depth is 63 fathoms and the bank steep-to.

At 18 miles west of Portudal the depth is 19 fathoms, shoaling gradually to 8 fathoms at 5 miles from that place. Off Serin point the water gradually deepens from Amboru bank, and at 21 miles in a westerly direction from that point the depth is 20 fathoms, whence to the parallel of Punshavel point the 20-fathom line follows the curve of the shore at a distance of about 18 miles.

Winds and weather.—The prevailing winds on that portion of the coast described in this chapter are during the fine season from NE. to NW., veering gradually during the day from the former to the latter direction; this daily variation is not experienced when farther from the coast than about 30 miles; the land breeze at night is felt when near the shore.

During the rainy season (end of June to middle of September) SW. and west winds occasionally blow with violence, but are not of long continuance; these westerly winds are generally light, and frequently interrupted by calms, particularly on the parallel of St. Louis.

Fogs are common on the coast at all seasons of the year.

Rollers occasionally set in with great violence and the sea has been known to break in a depth of 9 fathoms.

CHAPTER IV.

GAMBIA RIVER TO ISLES DE LOS (IDOLOS).

West Africa settlements.—The British possessions known by this name include the settlements on Gambia river, made an independent colony in December, 1888—isles de Los (Idolos), Sierra Leone, and Sherbro; the seats of government being at Bathurst and Sierra Leone.

Gambia river.—The estuary of Gambia river may be said to extend from Punshavel point to cape Bald, a distance of 27 miles in a southerly direction; but it soon contracts to a breadth of 10 miles between Barrada creek (off which Bird island formerly existed) and cape St. Mary, and to a width of little more than 2 miles between Barra point and the town of Bathurst, the entrance of the river proper. Immediately above the town the river again expands to a breadth of 7 miles; at Dog island point it is 4 miles wide, at Albreda 3, and at Muta point 1½ miles, gradually diminishing from thence, till at Macarthy island it is not ¼ mile across. This island is 150 miles above Bathurst, and though the course of the river is very tortuous, and divided by several islands, yet it is navigable the whole distance.

The banks of the river are covered with mangrove bushes and are of soft mud, rendering landing impossible except at the creeks or at the few villages on the banks.

Into the northern side of the estuary of the Gambia, four other rivers empty their waters, viz., the Salum, Jumbas, Fellane, and Jinnak, the two former of considerable size, and bring down large quantities of silt and sand, by which Sangomar bar and red bank are formed.

The least water found in January, 1887, by H. M. S. *Racer*, drawing 15½ feet, was 19 feet off Vintang point, as far as Deer island, 120 miles above Bathurst.

The depth of the channel between Bathurst and Macarthy island is subject to change, the least water found in April, 1877, was 14 feet off the east extreme of Kayaye island, 5 miles below Macarthy island; off this island the flood and ebb streams were regular, the former lasting 4 hours, the latter 8 hours, the rise of tide being 6 feet. A vessel of 10 feet draft with the aid of a pilot might proceed 70 miles beyond Macarthy island to Yarbutenda. The river is navigable for another 80 miles.

Sangomar bar lies across the mouth of the Salum river; it is south, distant 2½ miles from Punshavel point, carries 2 fathoms at low water, and is about 400 yards across; as spring tides rise 6 feet, vessels of considerable burden might load with facility in Salum river. The bar is dangerous to cross in boats.

Salum river, an arm of the sea about 60 miles in length, is entered by two channels; that close to Punshavel point is only available at high water for small coasting vessels, while the southern channel across Sangomar bar frequently changes in direction and depth; when past the bar the depth increases to 4 and 6 fathoms. Salum river is connected with the Jumbas and Gambia rivers by creeks. On the right bank it receives the Silif river, and the Fatik, on which is the town of that name, 10 or 12 miles from the junction. The navigation of Silif river is difficult; only small boats can ascend as far as Silif village, about 18 miles from the entrance.

Buoys.—NW. buoy is moored with Punshavel point bearing N. 59° E. (N. 79° E. mag.), distant $2\frac{1}{16}$ miles, and Bird Island point S. 61° E. (S. 41° E. mag.).

A buoy is moored with Punshavel point bearing N. 3° W. (N. 17° E. mag.), distant 4 miles, and Bird Island point S. 72° E. (S. 52° E. mag.).

Fundiun.—About 30 miles from Salum river entrance, on the left bank, opposite the mouths of Silif and Fatik rivers, is the French trading factory, Fundiun, off which are depths of 16 to 23 feet. The chief of Fundiun is subject to the King of Sin, a territory lying northward of the Salum; the king's residence stands on the right bank of Fatik river.

Trade.—Trade on the Salum river is considerable; earthnuts are said to be cheap and of excellent quality; silver coin is used.

Water.—Fresh water is scarce, it may be obtained by digging on the Sangomar peninsular at the entrance, and sometimes at Kamakan on the left bank between Fundiun and Kaolakh. Water brought from Sangomar is sold at Fundiun, at about one cent per quart.

Kaolakh, a town near the head of the Salum river, can be reached in vessels of 8 feet draft. The rise and fall of tide at Kaolakh is about 2 feet.

Banjala creek.—The entrance to this creek is easily passed when the sea is smooth outside, but at other times it is most unsafe after passing the bar There is a good wide passage for boats or small steamers around Sangomar bar.

Bird Island bank (Red bank).—This extensive bank fronts the shore between Sangomar bar and Buniada point, a distance of 18 miles; its western extremity lies 6 miles from the shore. The intermediate coast is low, intersected by the mouths of the rivers Jumbas, Fellane, and Jinnak creek, and fronted by several very shallow ridges and knolls. Some of these dry at low water, and it is possible that means might be found of buoying an approach to either the north or south channels, into which the entrance to Jumbas river is divided by Jum island.

Jinnak creek leads into the same channel as the Banjala creek. The bar is rough even in fine weather and with comparatively smooth water in the estuary.

Bird spit.—There is one very dangerous spot at the western extremity of Red bank that is absolutely steep-to—the soundings suddenly decreasing

from 4¼ fathoms to 2 feet. The shoalest part that nearly dries at low water lies westward about 6½ miles from Barrada creek, and is named Bird spit.

Caution.—Bird Island bank (Red bank) is especially dangerous to approach during the harmattan season, because, when estimating distances from the shore the haze makes it appear further off than it really is. Soundings are no guide, as in many places the edge of the bank rises abruptly from a flat of 4 fathoms to less than one fathom, as at Bird spit.

Soundings.—In approaching Gambia river direct from seaward on the parallel of 13° 33′ N., the depth of 100 fathoms, fine dark sand, will be found at 50 miles west of cape St. Mary; there are 20 fathoms at the distance of 30 miles, and 10 fathoms at 18 miles west of the cape, at which latter distance, if the weather be clear, the tops of the trees will be just discernible. When the depth decreases to 6 fathoms, the vessel will be 12 miles from cape St. Mary, and the same distance from Bald cape, when in clear weather the land about them should be seen. The general depth between this position and African knoll is 4½ to 5 fathoms, but two or three 4-fathom shoals exist, as also one of 2¾ fathoms, from which African knoll bears N. 81° E. (S. 79° E. mag.), distant 1¾ miles, and a shoal of 2½ fathoms at nearly 2 miles S. 64° W. (S. 44° W. mag.) of the knoll. As a general rule the nature of the bottom on the northern side of the entrance to the Gambia is mud, and that on the southern side is sand and mud mixed.

Dangers.—Horseshoe bank, the northwestern danger at the entrance of the Gambia, is about 5 miles in circuit, and reported to have only 12 feet on some parts of it. The bank is convex at its SW. extreme, from which cape St. Mary bears S. 29° E. (S. 9° E. mag.) and African knoll S. 71° E. (S. 51° E. mag.), each distant 8 miles.

Bijol islands, WNW. of Bald cape are two small islands covered with grass and surrounded by reefs of rocks which extend 2½ miles westward of them and on which the swell always breaks. Some of these offlying rocks uncover at half ebb, and there are depths of 2 and 3 fathoms at ¼ mile from their western extreme; the coast between Bijol islands and cape St. Mary is fronted by sunken reefs extending is some places 2 miles from the shore.

African knoll is the northernmost of the shoals which lie off the south entrance point of the Gambia, and has (1886) from 15 to 20 feet water over it and deep water all around. The main channel of the Gambia is here 1¼ miles wide, the narrowest part being between the knoll and the flats off Jinnak creek, in a northeasterly direction.

Middle ground consists of two banks of 15 feet, about 1½ miles long, situated midway between St. Mary shoal and African knoll, with a passage on either side, which should only be used by those acquainted with the locality.

Buoys.—Northern, or Red bank, buoy (No. 1), painted red and surmounted by a cage, lies in 5½ fathoms, with cape St. Mary bearing S. 39° E. (S. 19° E. mag.), distant 13 miles, and Fairway buoy S. 2° E. (S. 18° W. mag.), 5¾ miles.

Fairway buoy (No. 2), black and white checkered, lies in 4¾ fathoms, with cape St. Mary (center of red cliff) bearing S. 62° E. (S. 42° E. mag.), distant 8¾ miles, and Middle buoy east (S. 70° E. mag.), distant 5½ miles.

Middle buoy (No. 3), painted red, and surmounted by a black cage, lies in 4½ fathoms, nearly midway between Fairway and African Knoll buoys, with cape St. Mary bearing S. 27° E. (S. 7° E. mag.), distant 4⅝ miles, and African Knoll buoy N. 87° E. (S. 73° E. mag.), distant 6⅝ miles. This buoy must not be mistaken for the Red Bank buoy.

African Knoll buoy (No. 4), painted black, and surmounted by a cage, lies 900 yards northeastward of the African knoll, in about 9 fathoms, with the northern point, Jinnak creek entrance N. 53° E. (N. 73° E. mag.) and eastern extreme of Bathurst point S. 13° E. (S. 7° W. mag.).

Caution.—The position of the buoys can not be depended upon.

St. Mary shoal is a narrow shallow bank, extending 5¾ miles in a NW. by N. direction from Bathurst. Between St. Mary shoal and the north side of St. Mary island the water is shallow.

Cape St. Mary is the northern extreme of the western entrance point of Gambia River estuary. Foul ground extends east and west of the cape, but at 2 miles NW. of it there are 5 fathoms. The cape is about 60 feet high, composed of red cliffs and capped by cocoanut trees, which, with the white house for convalescents on it, render it distinguishable at some distance; whilst on the northern side of the river entrance, on the contrary, the coast is covered by bush, and as a rule nothing can be distinguished in the mirage but the larger trees.

Pilots.—Native pilots for Gambia river can be obtained at Gorée.

Tides.—It is high water, full and change, at Bathurst at 9h. 10m., but the stream continues to flow 1½ hours after the tide has ceased rising by the shore; springs rise from 6 to 9 feet, the latter being the effects of the freshets during the period of rains, neaps 5 feet; neaps range 3 feet. The velocity also varies much, and frequently without any apparent cause. The ebb stream, diverted by Barra point, sets strongly down upon St. Mary shoal, while the main stream runs over Middle ground. In mid-channel, west of African knoll, the ebb stream sets directly to seaward; but near the northern shore it is variously affected by the tide from the creeks, and from the rivers Jumbas and Salum, before they unite and take the general direction of the coast.

Making the land.—The best parallel on which to approach the entrance of the Gambia is 13° 30′ N. (that of cape St. Mary), or 13° 34′ N. as the land about the cape is quite distinct in character from the other portions

of the coast, and higher. If cape St. Mary is made, and the sanitarium distinguished, there need be no difficulty in picking up African Knoll buoy without a pilot. There are no natural marks and strangers should not proceed beyond African Knoll buoy without a pilot.

Outer anchorage.—If the buoys can not be made out, a vessel should anchor in 5 fathoms off the sanitarium on cape St. Mary, and, if necessary, send to Bathurst for a pilot.

Landing.—During the rainy season landing can be effected on the sandy beach southward of cape St. Mary; at other seasons the breeze sets in fresh from the sea, creating a surf that renders landing unsafe.

Directions.—From the northward.—After passing cape Verde, bring Cape Manuel lighthouse to bear N. 20° W. (north mag.), and maintain a S. 20° E. (south mag.) course, allowing for the current according to the season of the year; the soundings should be frequently verified, and the depth not decreased to less than 10 fathoms till near the parallel of 13° 34′ N., when the entrance should be made from the westward.

From the southward.—The great dangers in making Gambia river from the southward are the Bijol islands, but the land adjacent to them being high, a good estimate may be formed of its distance, and by not reducing the depth of water to less than 6 fathoms a safe distance from the rocks will be insured. After passing Bald cape and Bijol islands, a position north of cape St. Mary should be sought, from whence measures could be taken to enter the river, or to anchor and obtain a pilot; in hazy weather with an ebb tide great care will be necessary to prevent being set too far toward Horseshoe bank. In passing Bijol islands, if the flood stream is running, the soundings should not be decreased to less than 8 fathoms.

If the buoys are in position and can be made out, there is no difficulty in entering or leaving the Gambia without a pilot, in a steamer of moderate draft; a vessel of over 24 feet draft should if possible take a pilot, as in consequence of the heavy rains bringing so much deposit down the river, the shoals vary in their positions, and the depth of water over them is often somewhat different from that shown on the chart.

After rounding African knoll on the north side, keep a mid-channel course for Bathurst of S. 13° E. (S. 7° W. mag.), making due allowance for set of tide, especially at springs, but the water should not be shoaled under 6 fathoms. During the greater part of the year, when the trade wind blows from NW. and NE., a vessel may enter under sail.

Caution.—On no account should an attempt be made to enter the river without a pilot until African Knoll buoy is made out, and it should be borne in mind that the flood sweeps rapidly past Bathurst; also that both ebb and flood set toward African knoll and Middle ground.

Bathurst.—From cape St. Mary the coast trends E. by S. for a distance of 6 miles, terminating in a sandy point that forms the western entrance point of the Gambia and on which is built the town of Bathurst. Midway is the entrance to Oyster creek, which, communicating with the river 3 miles above Bathurst, forms St. Mary island. An iron bridge crosses the creek.

Bathurst was founded in 1816. The European houses are large; those of the natives small and thatched; the population is estimated at 6,000. There is a hospital for sailors. The administrator for the colony of Gambia resides here. There is a customhouse and quarantine establishment.

The United States is represented by a vice consul.

Telegraph.—Bathurst is in telegraphic communication with Porto Praia, St. Jago, St. Louis *vid* Gorée bay, Bissao, Konakri, isles de Los, and Sierra Leone.

Barra point (on which fort Bullen is built) is the eastern entrance point of the Gambia river, and may be recognized by a conspicuous clump of trees; it bears from Bathurst, its western entrance point, N. 48° E. (N. 68° E. mag.), distant 2⅓ miles; on that line the navigable part of the channel is 1½ miles wide.

Anchorage.—The best anchorage out of the influence of the whirl of the tidal stream, is in 10 fathoms, mud, with the south end of the town of Bathurst bearing S. 87° W. (N. 73° W. mag.), eastern end of the town of Bathurst N. 13° W. (N. 7° E. mag.), and Barra Point clump N. 23° E. (N. 43° E. mag.) A vessel should either moor or lie with a long scope of cable, as the constant swinging makes a foul anchor almost a certainty if riding with little chain out.

Climate.—The rainy season, when the land and sea breezes are not regular, is the most unhealthy; but the rains are not heavy or continuous as at Sierra Leone. It is recommended to vessels remaining at Bathurst for any time, to haul out to the African Knoll buoy for at least two days a week to insure the health of the crew. The best months are from December to April; the worst, September, October and November.

Population.—In 1881 the population of the settlements on the Gambia numbered 14,150.

Tornadoes.—Severe tornadoes of short duration occur in July.

Communication with London once in three weeks; Liverpool, every alternate Saturday; no railways.

Supplies.—Beef and fowls of inferior quality may be had; vegetables and fruit are usually very scarce; the water at Bathurst is brackish and difficult to obtain, a better quality may be had at Jillifri, 16 miles above Bathurst, on the right bank of the river, but vessels fitted with condensers are recommended not to use the water from the shore. Good bread is ob-

tainable in limited quantities. Fish are abundant at the north side of the entrance.

Coal.—The coal store is at the south extreme of the town, where a shelving beach renders flat bottomed boats necessary to expedite coaling, but the supply is uncertain both as to quantity and quality. There are several wharves or jetties extending from the shore of Bathurst alongside which small vessels lie and take in or discharge cargo. The more important of these have small tramways laid leading to warehouses, and there is a small crane capable of lifting about a ton weight. There is a depth of 2 fathoms at low water alongside.

Dog Island point is low and covered with bush. A thick cluster of trees rises about ¼ mile inside the point. The west extreme of the small islet off the point has trees on it, the east extreme only bush. The shoal ground south of the point has extended its SW. edge, with 7 feet on it at low water spring tides and lies with Dog Island point bearing N. 5° E. (N. 25° E. mag.), distant $1\frac{4}{10}$ miles, and fort James S. 82° E. (S. 62° E. mag.). From this edge the shoal ground, composed of rock and mud, curves northward toward Dog Island point, and extends in a S. 76° E. (S. 56° E. mag.) direction, with depths of 5 to 24 feet for about one mile.

Lamin point is low and dark, with a large clearing ½ mile to the westward.

Albreda makes as a low point with several white houses on it, and is easily distinguished by them, and by a house with a flight of steps facing to the southward, close to the point, and surrounded by a thick clump of fine silk cotton trees.

Directions.—To anchor off Albreda, when the western white house bears N. 3° E. (N. 23° E. mag.), steer for it and anchor in 4¼ fathoms. There is a good berth more to the eastward in 4½ fathoms, with fort James S. 56° E. (S. 36° E. mag.) and Lamin point N. 87° W. (N. 67° W. mag.). There are several 3-fathom spots off Albreda.

Fort James is the ruin of an old fort surrounded by small trees on an islet lying S. 57° E. (S. 37° E. mag.) of Albreda.

Vintang creek is navigable from its entrance to Sandeng (a distance of 40 miles) for a vessel drawing 9 feet, at any time of tide, and by crossing certain places at high water, a vessel drawing 13 feet might reach Sandeng; but would find difficulty in turning there if exceeding 150 feet in length. The deepest channel is as a rule, in the center of the creek, and varies from 10 feet in the broad places to 10 fathoms in the narrow.

In January, 1892, H. M. S. *Sparrow*, drawing 13 feet 3 inches, proceeded 7 miles above Kansala, least depth obtained at low water was 16 feet, and anchored off the second large clearing on the southern bank known as Sangajor wharf, having just room to swing.

There is very little trade in Vintang creek, and the people have few canoes; from Kansala to Bondali, a distance of 18 miles, not even a hut was seen.

Mosquitos and sandflies render it almost impossible for any white man to sleep without a mosquito net.

Supplies are very scarce at Kansala; a few fowls and eggs can be obtained occasionally.

Tides.—At Kansala it is high water, full and change, at 0h. 5m.; springs rise 6 feet; neaps 3 feet; the greatest rate of the stream observed was 2½ knots.

Suara creek extends about 16 miles to Contango with a general breadth of 150 yards for 10 miles, and a least depth of 20 feet to Jien creek, on the left bank. Above Jien creek there are several shoal patches of 6 feet, the creek gradually narrowing to 20 yards in Contango creek.

Tankurál is a village in a large clearing close to the water's edge. The land near has a park-like appearance when approaching from the westward.

Mendora, or Manoika, creek has shoal ground extending off it some distance into the channel.

Tendeba is a small village in a clearing close to a low point, with two cotton trees, one on the extreme of the point, and the other 400 yards to the eastward. It is high water at Tendeba 3 hours later than at Bathurst and the streams continue after high water for the same time as at that place.

Jurong creek is ½ mile to the eastward of a large clearing, and is about 300 yards wide at the entrance, but soon becomes narrow and winding. It is navigable at high water by a steamer for about 3½ miles, to the landing place at Jurong. A shoal dries off the east point of the entrance for 70 yards at low water. There is one fathom 30 yards from the west point of the entrance, and a depth of 10 to 12 feet between the points.

Devil bank appears to have grown considerably since the last survey of the Gambia.

Devil point is high and steep-to. From Boerang creek to Dumansansang creek the country on the south bank is much more open than that below and high reeds take the place of mangrove bushes.

Balingha hill is conspicuous when going up the river. When nearly abreast of the hill there is a small landing place, and a trader's house about 300 yards from the bank.

Tides.—At Albreda it is high water at 1h. 20m., at Tankurál 2h. 40m., and at Jurong creek 4h., respectively, later than at Bathurst. The stream continues to run 1h. 20m. after high and low water by the shore. In the rainy season, July, August, September, and October, the flood stream is not felt higher than Kaua. Above this the stream is always running down, making the water fresh as far as Tankurál.

Pilots.—Ships of 12 feet draft proceeding above Suara creek for the first time should take a pilot.

Directions from Bathurst to Deer island.—From Bathurst steer S. 17° E. (S. 3° W. mag.) until two small islets open to the northward of Dog Island point, then steer S. 57° E. (S. 37° E. mag.), (passing that point at a distance of 2 miles, and remember that the shoal south of this point is extending), until the land beyond Albreda opens of Lamin point, when alter course to pass a mile from Lamin point and ½ mile from Fort James islet. Pass ½ mile from Tudor point, steering N. 70° E. (east mag.) until the right extreme of Joba (Sami) creek bears N. 20° W. (north mag.), when proceed N. 53° E. (N. 73° E. mag.), with Muta point ahead. Do not shut fort James in with Tudor point until the east extreme of Vintang creek bears S. 43° E. (S. 23° E. mag.). When Jurunko creek bears N. 20° W. (north mag.) steer N. 45° E. (N. 65° E. mag.) keeping a point to the eastward when nearly abreast of Unkafala creek, and continue on that course until Salekaine point opens of Muta point. Pass Muta point at a distance of 800 yards, ¾ mile off Tankurál, and 800 yards from Jarin point. From Jarin point keep Tubakólong point half a point on the port bow, passing ½ mile from Jemaali. (Close in shore off Tubakólong point there is a patch of rocks dry at low water, with the point bearing N. 73° E. (S. 87° E. mag.), about 400 yards distant.) When abreast Mendora creek bring the tree inside Jarin point to bear S. 67° W. (S. 87° W. mag.) and steer N. 64° E. (N. 84° E. mag.) to pass 800 yards from Tubakólong. After rounding Tubakólong keep about 800 yards from the south bank until abreast of Kashan creek, then proceed in mid-channel. On passing Forester bank keep the trees at Tendeba shut in with Kashan point. Pass 800 yards from Krule point, and then keep 800 yards from the south bank until Devil point bears S. 88° E. (S. 68° E. mag.), when gradually alter course to the eastward, passing 100 yards from Devil point. Then keep about 200 yards from the north bank as far as Farafinya creek, 300 yards off until abreast of Kajamang creek, and afterwards in mid-channel. As soon as Ginoi point is shut in gradually close the south bank, passing Sankuia creek at the distance of 200 yards. Steer in mid-channel from Karantaba creek and down Notown reach, inclining to the south bank near Buba creek and closing with it to pass 100 yards from Batima creek. Then proceed nearly in mid-stream, keeping on the Elephant island side. From the north end of Elephant island steer towards Dumansansang creek, and thence to Kaua, about 200 yards from the west bank, and in mid-channel to Deer island, which is 120 mile above Bathurst.

Vessels should anchor in as wide a part of the river as possible, and the kedge is recommended, as the anchor sinks into the mud.

Native sailing cutters from 5 to 12 tons keep up communication between Bathurst and Macarthy island, taking from 7 to 10 days going up.

Leaving Gambia river.—The best time to weigh from Bathurst under sail is on the last of the flood, so as to gain mid-channel before the full strength of the ebb, which, as it sets directly down upon the Middle ground, would in light winds make it necessary to anchor in order to avoid it. This would cause the loss of a day's tide, unless the sea breeze should come in sufficiently strong to enable the vessel to weigh again, and to stem the ebb; with that chance in view, if obliged to drop the anchor, it should be done sufficiently soon to preserve room for weighing. Further down the channel the sea breeze from the northwestward is always a beating wind, and even the land breeze in the morning is seldom sufficiently to the eastward to lead out without making a tack, especially as when it is most favorable it has the least strength, and consequently the tide will have the more time to exercise its influence.

After weighing, stand over towards Barra point, keep the lead going, and make very short tacks off the bank on the eastern side of the channel, especially when nearing African knoll, where the set of the ebb tide is always the strongest.

Coast.—From cape St. Mary to Bald cape is about 10 miles in a general SW. direction; and at 2½ miles further SW. is another projecting point, with a reef extending west from it over a mile, and a rivulet of fresh water on its south side. From this point the coast trends S. by E. for a distance of 16 miles to the St. Pedro river, and from thence southerly for 32 miles to the entrance of the Kasamanze river.

The general color of the coast about cape St. Mary is variable, becoming white to the westward of the cape, and then reddish, and further southward changing into gray sand. Between Bald cape and the Kasamanze river the coast is very low with a sandy beach covered with trees, which in the vicinity of St. Pedro river appear from a distance like a continued forest, with lofty clumps resembling islands. The water is very shallow, the bank suddenly curves outwards, and abreast of Suta river in latitude 12° 44′ N. and 17 miles from the shore, there is a 4-fathom bank of 5 or 6 miles in length, lying in a NE. and SW. direction.

Bliss river, 12 miles north of the entrance to Kasamanze river, Suta river, 3 miles south of Bliss river, and Oyster river, 6½ miles south of the same, all communicate with Kasamanze river, but their entrances are obstructed by sand banks.

Kasamanze river.—Off the entrance of Kasamanze river there is a depth of only 4 or 5 fathoms at the distance of 8 or 9 miles from the land, and at 10 miles distant there are 7 or 8 fathoms; at 11 miles from the north entrance point, in a SW. by W. direction, there is a bank of 4¼ fathoms; the 10-fathom line of soundings passes about 25 miles outside of the mouth of the river, and the 100-fathom line is about 40 miles W. by S. from cape Skyring.

The entrance to Kasamanze river is not easily recognized from the offing; it lies between Djoqué island on the north and Guimbering island on the south; the Grand bank of Kasamanze, composed of hard sand with 5 or 6 feet of water over it, lies between these islands.

The land on the northern side of the entrance is low and wooded, without any distinguishing marks.

The northernmost elevation on Guimbering island is rendered conspicuous from the offing by a white patch; there is an umbrella-shaped tree between this and the north extreme of the island.

From the NW. part of Guimbering island, shoals extend 2¾ miles from the shore. The principal French settlement at Kasamanze river is situated on Karaban island, on the south shore of the river, 3½ miles within the entrance.

Least depth.—The channels across the bar of Kasamanze river vary greatly in depth and direction; in 1876 the only available channel was that known as Djoqué pass, which lies close round the south extreme of Djoqué island, and in which the least depth was 8 to 9 feet, the sea in this channel is nearly always smooth. In 1885 there was a depth of 3¾ fathoms at low water springs in the Great pass and only 4 feet in the Little pass. Early in 1890 there was only 10 feet on the bar.

Beacon.—A beacon has been erected upon the most prominent part of Djoqué island. The beacon is of service when, owing to fogs, Guimbering and the entrance of the river are obscured.

Tides.—It is high water, full and change, on the bar, at 8h. 35m.; springs rise 6½ feet. The current of the flood sets to NNE. and NE., abreast of the middle channel; that of the ebb to SSW. and SW., with a rate of from one to 1½ miles an hour. In the channels the current sets in the direction of the edges of the banks, and attains a rate of 2½ to 3 miles an hour. The tidal currents are felt 7 to 8 miles outside of the banks. The currents inside of the river generally follow the trend of the banks; but their direction is modified near to the entrance by the streams from the numerous rivers which flow into the main river.

Pilots.—A pilot station has been established on the south extreme of Djoqué island, and a government pilot for these rivers resides at Gorée.

Anchorage.—Vessels while waiting for a pilot should anchor outside the bar in 4 fathoms, with the white patch on Guimbering island bearing S. 45° E. (S. 25° E. mag.) and the umbrella tree bearing S. 65° E. (S. 45° E. mag.).

Off Karaban the anchorage is 600 yards from the shore, in 8 fathoms, mud.

Light.—A fixed light is exhibited at Karaban island; it is 52 feet above the quay, and should be visible in clear weather for 3 miles.

Zighinkor.—At 25 miles up the Kasamanze river, on the southern bank, is the French factory of Brin, and 9 miles farther on the same side, at Zighinkor, the Portuguese have an establishment. A considerable depth of water may be carried up as far as that place, and the river is navigated by large schooners much farther. There are several well-cultivated rice plantations near the shore and some scattered huts.

Sedhiu, about 90 miles above the bar of Kasamanze river, is a flourishing French settlement. Vessels drawing 6 feet can ascend the river as far as this.

Winds and weather.—Winds from NE., north, and NW. prevail during the dry season at Kasamanze river (October until May); variable winds chiefly from a westerly direction prevail during the remaining months of the year.

Moderate rains and calms precede the rainy season (May–October); tornadoes blow at the commencement and end, but are most frequent at the former period. Heavy rains are experienced during July and August. Thick fogs are of common occurrence at all seasons of the year.

Solar winds from NE. to NW. prevail on the coast of Senegambia from November to June; they are often disturbed by the harmattan from November to February. The solar winds blow fresh from November to April; they vary about 6 or 8 points, and afford every facility for beating to the northward within 20 miles of the land. The changes are as follows: At sunrise the wind commences to freshen from NE. or NNE., sometimes more from the eastward close inshore; about midday it falls lighter, and hauls to the northward; toward 1 or 2 p. m. the breeze freshens again from NNW. and NW., increasing in strength toward evening, and lasting until midnight, when there is usually an interval of calm or light airs until it returns to NE. In beating along the land stand in during the day so as to be as near as it is prudent to be about midnight; as soon as the breeze makes from NE., take the offshore tack, and hold it until midday, or as long as the wind is east of north; as soon as it freshens again from the westward of north go about, and stand in as long as possible.

Refraction.—The refraction produced by the heated atmosphere along this whole coast is a continual source of error in the astronomical observations. The only recourse against fatal mistakes will be checking the observations made during the day by altitudes of stars and planets taken during the night; still these precautions are liable to error. Only one thing is to be trusted, and that is the lead; keep it going, and especially when approaching the land.

Sometimes the distant shore will appear alarmingly close to the vessel, and at others the near land will appear far distant, even to the most practiced and experienced eye.

Cape Skyring.—At about 9 miles southward of the Kasamanze river there is an elbow of low reddish cliffs which interrupts the beach, and which has been named cape Skyring; it marks the place where the commander of that name lost his life, on December 22, 1833, while engaged in the survey of this coast. The adjacent bight in the shore, where the boats were lying which rescued his body, was named Murder bay.

Shoal.—About 5 miles westward of cape Skyring is a 2¼ fathom patch which lies directly in the track of vessels making for the entrance of the Cacheo river from the northward.

Cape Roxo.—From cape Skyring the coast trends SE. for a distance of 4 miles to cape Roxo, which forms the NW. limit of the approach to Cacheo river. The cape, when bearing about east, presents the appearance of downs of white sand, moderately high and covered with bushes. At 2 or 3 miles northward of this cape the country is well wooded and of a tolerable height, which it preserves for an extent of 9 miles. On one of the points formed by the coast there are several red patches, from which the cape has probably derived its name, but the cape itself is a low sandy point, covered with trees and bushes.

Cape Roxo is fringed with a reef, extending one mile to SE., which shelters the bight on the east side from the heavy sea; the village of Cabros, or Mossor, stands near the cape on the shore of this bight. Two miles SW. of the extremity of the cape the bottom is foul, and the depth inside of this distance varies between 3 and 5 fathoms, until the edge of the reef is reached.

Cape Barella, with its somewhat higher range of trees, lies S. 68° E. (S. 48° E. mag.), distant 8 miles from cape Roxo, and halfway between them there is an indistinct opening in the beach, named Subijack creek. cape Barella presents the appearance of white sand hills and reddish cliffs of clay, and from this cape a reef a mile in length projects to the southward.

Cacheo river.—Jufung point, low and wooded, is 8 miles SE. of cape Barella, the intermediate coast being very low, with the appearance of being intersected by small rivers or creeks, and fronted by a broad shallow flat. At Jufung point the low wooded coast turns to the eastward for 5 miles to Bolola point, from which cape Mata bears S. 71° E. (S. 51° E. mag.), distant 5 miles, these two latter projections forming the entrance points of Cacheo river.

Bolola point is low, with some lofty trees 2 miles west of it. At this point the shore abruptly turns to the northward, forming Katon bay, on the west side of which stands Bolola, a large village on the beach, and an intricate channel may be found, carrying 5 fathoms, leading close up to the houses. The ground in the neighborhood of the village is low and swampy, with extensive plantations of rice.

Katon bay is 2 miles in breadth at the entrance, and from the head a deep creek opens to the NE., which is said to communicate with the Kasamanze river at Zighinkor.

Cacheo banks.—The triangular space inclosed by the shore, and by lines drawn to the southward from cape Skyring, and to the westward from Jufung point, is full of shallow banks and irregular shoals, on many of which the sea breaks furiously: Coimbra bank, 5 miles S. 11° E. (S. 9° W. mag.) of cape Roxo; Falulo breakers, 5 miles farther off shore on the same bearing; Barella breaker, eastward of the latter, and Jufung breakers, which extend 6 miles westward from Jufung point, may be termed the northern group; while to the southward of the Direct channel into the river are situated Cacheo spit, Cacheo bank, Cacheo breakers, Parcels breakers, Cachops breakers, Garamas spit, and Mata and Domingo banks.

Shoal.—S. 27° E. (S. 7° E. mag.), distant 5 miles from cape Roxo, is a 10-foot shoal with a line of breakers at one mile to the southward. Coimbra bank has probably extended to this position.

Channels.—Two main channels lead from seaward to Cacheo river; the northern, known as the Direct channel, carries a depth of 12 feet at low water, and the southern, termed the Southwest channel, carries 15 feet at low water.

Direct channel.—The point at which a vessel must enter this channel is 13 miles from the nearest land about cape Barella and 16 miles from Jufung point; and to make anything like a straight course through it, being out of sight of all marks, several shoals of 2 and 2½ fathoms at low water must be crossed. As the highest tides do not rise more than 7 or 8 feet, a vessel of a certain draft only can with any propriety attempt it; and the best manner of proceeding will be to run in for the land somewhat to the northward of latitude 12° 20′ N., remembering the 2¼-fathom shoal off cape Skyring, so as to distinguish the red cliffs between capes Skyring and Roxo, but not approaching it in less water than 5 fathoms, nor to a less distance than 2 or 3 miles. Then steer S. 37° E. (S. 17° E. mag.) till abreast of cape Roxo, so as to see that point with certainty, for as its termination is low and sandy, and, like the other parts of the coast, covered with bushes, it does not appear well defined at a distance. Having now that cape on the port beam or bearing about N. 59° E. (N. 79° E. mag.) a lookout at the masthead for broken or discolored water, leadsmen in both chains, and being ready to haul out if they should call less than 4 fathoms, steer S. 9° E. (S. 11° W. mag.) for 11 miles, making due allowance for the deviation of the compass, which for such navigation ought to have been previously ascertained.

During this course the soundings will probably indicate when passing over the tail of Coimbra bank, the heavy Falulo breakers will probably

be seen, and at the end of the 11 miles the vessel ought to be in the fairway of the channel, in latitude 12° 8′ N., and in 6 or 7 fathoms water. At this point, however, it would be prudent to anchor, in order to verify the latitude by observation, to wait for the sea breeze, or to take the commencement of the flood tide, and, if practicable, to get out a couple of boats ready to send ahead with danger flags, in case of becoming entangled among the shifting sands which are found in the entrance of all rivers of this kind.

To enter.—These precautionary arrangements having been made, the weather being tolerably clear, and an anchor ready to let go, with a range of 10 or 12 fathoms of cable, the vessel may steer N. 78° E. (S. 82° E. mag.), southerly. For a distance of 7 or 8 miles the depth of 6 or 7 fathoms will be preserved; Jufung breakers, which may be seen on the port bow, will be passed in 4½ fathoms, at the distance of ½ mile, and their SE. sandy prong will have to be crossed in 2 fathoms. The water will now suddenly deepen, the land will have been for some time in sight, and the high trees of Bolola should be made out and brought ahead, on the bearing of N. 76° E. (S. 84° E. mag.), and kept so till within about 2 miles of the beach. Then alter course nearly a point to starboard, but still closing the shore, so as to keep in the deep but narrow channel northward of Domingo bank, and run parallel to the beach (off which some rude fishing weirs may be observed), till the low point of Bolola bears N. 25° E. (N. 45° E. mag.), distant about a mile. If the vessel draw no more than 12 feet, steer S. 82° E. (S. 62° E. mag.) from thence for cape Mata, till the main channel of the river is reached; but if requiring deeper water it will be prudent to anchor and send boats to examine the best track across the bank or bar, which unites Domingo bank to Katon flat.

Anchorage.—Having crossed this bar, and now fairly entered the river, anchorage may be had in 6 or 7 fathoms on good holding ground between Bolola point and cape Mata.

Nature of bottom.—There is a satisfactory rule which applies to the entrance of the Cacheo, as well as of all the rivers on this part of the coast of Africa, and which the seaman should bear in mind: that in the channels the bottom is always of soft mud, but on the banks always of hard sand; and, therefore, the lead in a careful hand will give immediate notice of any deviation from the fairway.

Southwest channel.—The above are the best rules which can be given for entering Cacheo river by the Direct channel, an enterprise requiring great coolness and promptitude, and which should be attempted only under favorable circumstances, and in a manageable vessel. But as there is reason to believe that the banks which form that channel are not stationary, and that they frequently change both in shape and extent, it will be proper to

give the mariner the choice of another entrance, which, though more circuitous and equally surrounded by dangers, has somewhat deeper water, and offers better opportunities for a retreat in case of unforeseen difficulties.

Directions.—To take Southwest channel, make the land between capes Skyring and Roxo, as before directed; approach it within 5 or 6 miles or into about 6 fathoms; run alongshore till cape Roxo bears east (S. 70° E. mag.), so as to be sure of the position, and then haul off to make a south (S. 20° W. mag.) course, allowing for tide, current, and swell, and pursue this course for 19 or 20 miles. If the deviation of the compass be known, and the above allowances fairly made, at the end of this run the vessel will be in latitude 12° N., and in 7 or 8 fathoms water, and will have passed well outside all the banks, although the lead will probably show the change of a fathom or two in the soundings when crossing their tails. Here it will be prudent to anchor, in order to verify the latitude, and to wait for the sea breeze, a flowing tide, and sufficiently clear weather, as well as to make all those arrangements which were recommended for the former channel, and which are so necessary in such intricate navigation.

Supposing that everything has turned out favorably, weigh, and steer east (S. 70° E. mag.) for a distance of 15 or 16 miles, allowing for the oblique set of the flood tide. During this run the Parcels breakers will probably have been made out from the masthead, and the Cachops breakers will be more certainly seen, in passing them at a distance of 2 or 3 miles on the port beam. The water will have been gradually shoaling, so that by this time the depth will be reduced to nearly 5 fathoms, and unless the weather should have become hazy, the low land will be seen ahead, and Cayo islands bearing S. 57° E. (S. 37° E. mag.).

The three points on which the mariner has to rely for a knowledge of his position are, the sight of Cachops breakers, the distant bearing of Cayo islands, that are at the dividing point of Cacheo and Jeba rivers, and the fact of having arrived at the (low water) depth of 5 fathoms. From this position the course to be made good is N. 34° E. (N. 54° E. mag.) for 11 miles; the last 1¼ miles will be across the bar, where the depth is only 13 to 16 feet at low water. Before arriving on the bar the same soundings will be had when crossing the east extremity of the Cachops breakers and the west extremity of the Garamas spit, both of which should serve to verify the position and ascertain if due allowance has been made for the current. Before reaching the bar the high trees westward of Bolola point will have been sighted from aloft, and should be brought ahead, bearing N. 34° E. (N. 54° E. mag.); Garamas island will also be seen, and subsequently cape Mata, off the starboard bow. The bar crossed, the soundings will increase abruptly to 6 or 7 fathoms, and the position will be in the narrow channel between the Domingo and Mata banks. As soon as Bolola point bears N. 48° E. (N. 68° E. mag.), and Cape Mata N. 76° E. (S. 84° E.

mag.), the course should be changed immediately to N. 74° E. (S. 86° E. mag.) until you are in the entrance of the river, or abreast of cape Mata. From abreast of cape Mata, the course up Cacheo river is about N. 48° E. (N. 68° E. mag.) for a distance of 11 miles, as far as the old Portuguese fort of Cacheo. To this position the lead will be found a safe guide, and any vessel may safely anchor off the fort in 5 fathoms, on good holding ground. The shores are everywhere covered with mangroves, which grow in the water, and which render landing impracticable, except at a few spots. In 1869 Cacheo was declared a free port.

Sara bank.—It is apparent from the chart that as soon as the two entrance capes are passed all difficulty vanishes, and that vessels of any draft may freely proceed, not only to the fort of Cacheo, but to Farin, which is 100 miles from cape Mata, by keeping in mid-channel, and, as in all other rivers, by avoiding the points. In that whole space there is but one danger, viz, a bank which fronts the northern shores east of Sara creek, 13 miles above Cacheo fort, which projects a little more than halfway across the river, and which may be easily avoided by borrowing on the southern shore. The flood tide is scarcely felt above Salsang, 50 miles from the mouth of the river, and the ebb stream is not very strong in any part of river, except toward the end of the rainy season (about December).

Farin stands on the right bank of the river, 85 miles from the entrance; it is but a small place, with few native inhabitants. A few supplies may be obtained; and as the rapids are only a short distance higher up, the water is fresh and good. The climate is invigorating, after the sickly heaviness of the atmosphere lower down the river.

Near Farin the mangrove entirely disappears, the country becomes clear, a gently rising tract of fertile soil commences, and a few scattered cotton plantations may be seen in the vicinity of that village. It is said that there is easy and constant communication from hence to Bissao, and to Kasamanze and Gambia rivers.

Batoor is the largest town on the river, situated 70 miles from its mouth, and the inhabitants are the most civilized; they are all Mohammedans and of the Mandingo tribe, which is the most powerful of the numerous tribes that have possession of this country.

At the town of Batoor the clay soil is visible between the mangroves, the shores become steeper and rocky, and good-sized forest trees, including the mahogany, are seen on the banks.

Tides.—It is high water, full and change, on the bar of Cacheo river at 7h. 45m.; springs rise 8 feet. The ebb stream in the Cacheo, as also off it, sets to the NW., and the flood to the SE. The ebb generally runs 8 hours, while the flood rarely runs more than 4, nor can it generally be considered a regular flood tide, but merely a slack water or cessation of the ebb. Toward December, after the rains are over, and the harmattan sea-

son has set in, the wind generally blows very strong from NE. to ESE., which tends considerably to strengthen the ebb stream, and during that season vessels at anchor rarely swing to the flood.

At Farin, the effect of the tide is greatly felt, the rise and fall amounting to 1½ fathoms. Vessels ascending the river should (owing to this difference in the tides) coast along the right bank until they find depths of 2 fathoms, which will be about 4 miles from Farin, and then proceed until in front of the fort.

Garamas island lies 4 miles south of cape Mata. The island is covered with trees, but not readily distinguished on account of its proximity to the coast. Three miles farther south is the entrance to Jatt river, which flows round northward of Jatt island. The coast is low and wooded. The Cayo islands are near the southwestern point of Jatt island.

The Jatt shoals front the entrance of the river of this name; portions of them uncover at low water, and the breakers extend 10 miles off shore; their western edges are nearly on the meridian of Bolola point, and close to the breakers there is 13 to 16 feet of water. The Jatt breakers are connected with Garamas spit, and front the whole coast between cape Mata and the Cayo islands.

Jatt river.—The Jatt shoals obstruct the entrance of the Jatt river so that only boats may enter it by following along the coast. It fronts the western coast of Jatt, Bassis, or Bisis, and Bissao islands. Besides the Jatt breakers there are other parts of the extensive bank on which the general depth is between 3 and 12 feet, which uncover at low water, or present long lines of heavy breakers. The sand bank, which uncovers 4 or 5 feet at low water, lies in the middle of the entrance, leaving only two narrow channels, one on each side, in which the depth is 3 to 5 feet at low tides. Thus the Jatt river is barred at its sea entrance, but it may be reached through the Catherina, or Ancoras, channel, which communicates with the Jeba.

Cayo islands.—The Cayo islands lie close to Cayo point, and appear at a distance like three small hummocks, but at low water their bases unite; they are not high, but being covered by dark lofty trees stand out very conspicuously at times from the low land behind them, and form the principal landmark for approaching the Jeba.

Jeba river.—The Jeba is a much larger river than the Cacheo, its mouth being 15 miles wide, in a S. by E. direction, from Cayo point to Karashe island, the northwestern of the Bijouga group; at 90 miles eastward of Cayo point it has a breadth of 4 miles. There are many dangerous banks in its entrance, as well as higher up, but they may be easily avoided, and it is not traversed by any shallow bar. The usual channels by which Jeba river is entered are Jeba channel, leading to Bissao channel on the northern side of the estuary, and Orango channel, leading to Kanabak reach and Bulama and Arkas channels on the southern side.

Above Bissao the channel of the river is obstructed by numerous shoals, the passages among which are only available for small vessels.

The periodical rise of Jeba river commences in July; the waters begin to fall about the middle of September, and continue falling until the end of October.

Bijouga, or Bissagos, islands.—This extensive group of islands lie in the estuary of Jeba river, dividing the northern and southern approaches. It was partly surveyed in 1826–1834, but not sufficiently examined to enable strangers to make free with the various channels by which it is intersected; nor is it likely that there will be any inducement for vessels to penetrate its interior waters, or to have any farther intercourse than may be afforded by the open channels of Jeba and Orango. Besides a few bare or unproductive rocks, the whole cluster consists of 13 islands, occupying a space of about 50 by 35 miles. They are all volcanic and highly fertile, although, as far as could be perceived, generally deficient in water. Most of the islands are inhabited; the men are active and powerful, but revengeful and treacherous, and averse to any species of barter or exchange; nothing but firearms and powder tempt them.

Their houses are circular and built of stones and mud; the doors are low, and there being no windows, they are insufferably dark and hot, though they are well thatched with broad projecting eaves. Their canoes are large and clumsy, and would contain 40 or 50 men with paddles.

Shoals and foul ground extend for a considerable distance west and south of Bijouga islands, which should be approached with great caution.

Bijouga breaker.—A small bank, on which the depth of water is from 12 to 18 feet, lies S. 59° W. (S. 79° W. mag.) of Cayo point distant 39 miles; from the shoal cape Roxo bears N. 11° E. (N. 31° E. mag.), distant 50 miles, and the nearest land (Karashe island) bears east (S. 70° E. mag.), distant 28 miles.

A shoal, on which the depth of water is 12 feet, lies S. 59° E. (S. 39° E. mag.) of Bijouga breaker, distant 5 miles.

Warang bank.—This bank, which partially dries at low water, lies off the western entrance to Warang channel; it extends 7 miles in an east and west direction within the depth of 3 fathoms, and its western extremity bears S. 53° W. (S. 73° W. mag.) of Cayo point, distant 25 miles.

Remarks.—During the harmattan season, when steering for the Bijouga islands or navigating the channels between them, the reckoning and lead will be found the best guides, the land being difficult to distinguish from a distance of more than 3 miles.

Most of the banks in Jeba river and among the Bijouga islands are composed of hard sand and are steep-to, so that the unceasing use of the lead is even less efficient in giving warning by the actual depth of the water than by showing the nature of the bottom, which in the channels is

generally of soft mud and round the edges of the banks of hard sand; therefore instant attention should be paid to the change thus indicated.

Jeba channel.—The entrance to Jeba channel is obstructed by Cayo, Middle, and Karashe banks; of the four channels formed by them, the northern, known as Cayo channel, is the only one recommended for large vessels.

Cayo bank, about 8 miles long within the 5-fathom line in an east and west direction, is narrow and has over it a general depth of 4 fathoms; but in one place, bearing S. 17° E. (S. 3° W. mag.), distant 4 miles from Cayo islands, it rises into a knoll of sand with only 12 feet upon it.

Middle bank is also a narrow bank parallel to Cayo bank, and about 5 miles long within the depth of 5 fathoms; the least water on this bank is 3 feet, and it lies about ¾ mile southward of Cayo bank.

Karashe bank lies about 2½ miles southward of Middle bank; the eastern part is marked by heavy breakers, and a shoal of 12 feet water lies near its western extreme.

Arlett point, though very low, may be recognized by a village near the shore; it lies S. 62° E. (S. 42° E. mag.) of Cayo islands, distant 14 miles. In the space between, the wide opening of Catherina bay will be seen; the head of this bay unites with the channel round Jatt island, and, with Balantes bay and Martinho and Bissao creeks, divides the right bank of Jeba river into a series of large islands.

Arlett bank, on the western part of which there is only a depth of 15 feet, extends in a W. by N. and E. by S. direction for a distance of 3 miles within the depth of 3 fathoms; the eastern edge of this bank lies 2¼ miles westward of Arlett point.

Balantes bay.—Biombo point, which is low but safe to approach on its southern side, forms the eastern entrance point of a deep inlet between Arlett and Biombo points, and which is known as Balantes bay.

The entrance to this bay is obstructed by shoals, on the western part of which are Ankora islands.

Ankora islands are three in number off Ankora point; the western is very low; the southern is marked by a conspicuous tree on the summit.

Martinho bank, which is a narrow but steep ridge, and the more dangerous as it seldom breaks, though carrying only 6 feet at low water, lies eastward of Biombo point, distant 5 miles. There is a passage between this bank and the flats off Martinho creek, but, unless in a case of the greatest necessity, all vessels should keep out in the main channel or south of Martinho bank. When in 10 fathoms, at about a mile southward of the bank, Biombo and Martinho points bear N. 65° W. (N. 45° W. mag.) and N. 56° E. (N. 76° E. mag.), and therefore, in proceeding up or down the river, a vessel should not borrow on the bank by parting with the one bearing till the other be obtained.

St. Martin grove is a conspicuous clump of trees one mile inland, at 6 miles northeastward of Martinho point; a conspicuous isolated tree is situated 1¾ miles westward of St. Martin grove.

Directions.—The obvious rule for entering by the northern channel (Cayo channel) is to get into the latitude of Cayo islands, or a mile or two farther to the southward (11° 48′ N.), and steer east (S. 70° E. mag.) across Great Jeba flat in 8, 7, and 6 fathoms, till Cayo islands are seen ahead, or a little on the port bow; or, if the vessel is coming from the northward, and has had an opportunity of making cape Roxo satisfactorily, an equally sure method of hitting the entrance will be to bring that cape to bear east (S. 70° E. mag.), distant about 6 miles; then, allowing for the tide, steer south (S. 20° W. mag.) for a distance of 20 miles, which will place the vessel in latitude 12° N. and in 8 fathoms water; from this position steer S. 68° E. (S. 48° E. mag.) and the soundings will indicate a gradual approach towards the edge of Jatt flats; this course will lead safely to a position within sight of Cayo islands.

Cayo islands should be passed in 6 or 7 fathoms, at a distance of not more than 2 miles, in order to pass north of Cayo bank; from this position steer S. 68° E. (S. 48° E. mag.), which will lead south of Arlett bank, from whence an S. 88° E. (S. 68° E. mag.) course will lead across the broad mouth of Balantes bay, in a depth of 10 to 20 fathoms, though over very uneven ground, passing 1¾ miles south of Ankora islands.

Anchorage.—Having entered the river in the evening, a safe berth to wait for daylight is in 14 fathoms off Balantes bay, with Biombo point bearing N. 59° E. (N. 79° E. mag.) and Ankora island bearing N. 57° W. (N. 37° W. mag.).

To proceed.—From a position in 10 fathoms, at one mile south of Martinho bank, the course may be altered to about N. 70° E. (east mag.) so as to keep near the northern shore to avoid too near an approach to the suspicious flats which project from Gancho banks; a run of 13 miles through irregular soundings of 10, 5, and 12 fathoms, will take the vessel abreast of Bernafel point, which, on account of a shallow spit, should be passed in 7 or 8 fathoms, or at a distance of 1¾ miles. By this time the town and fort of Bissao, and the two conspicuous islands Passaro and Rey will have been seen; by opening the latter halfway out to the eastward of the former, bearing about N. 36° E. (N. 56° E. mag.), the spit will be avoided and a clear course offered to the anchorage. Run along the eastern side of Passaro island, which seems to be quite safe at the distance of ½ mile, and steering for Bissao fort, anchor either halfway between the islands or proceed at once to the town, off which a good berth may be taken in 7 fathoms, mud, with the fort bearing N. 43° W. (N. 23° W. mag.), and Rey island between S. 54° E. (S. 34° E. mag.) and N. 48° E. (N. 68° E. mag.). It is necessary to remark that there are short spits extending from the NE. and

SE. extremes of Passaro island, and from the SW. extreme of Rey island, and that from the latter island an extensive bank extends to the NE.

Telegraph buoys.—A telegraph cable having been laid from Bissao to Bulama, anchorage is prohibited between the SW. point of Rey island and Bissao fort. Vessels must not pass to the northeastward of this line. The following buoys mark the direction of the cable: A buoy, egg-shaped and painted red, with the word "Telegraph," is placed on a line between Passaro island and Pedralva rocks, distance 4½ miles from the former. Vessels are not allowed to anchor on this line. A similar buoy lies with Pedralva rocks beacon, bearing N. 60° W. (N. 40° W. mag.), distant 3¾ miles. Anchorage is prohibited on a line drawn from Bulama point through this buoy. A conical buoy marks the position of the cable near Mao bank. From it Colonia point bears N. 57° E. (N. 77° E. mag.), and Preco Leve point N. 32° W. (N. 12° W. mag.), distant about 2 miles. Anchorage is prohibited on a line SSW. from Colonia point. A buoy is moored off Bulama for the same purpose. Vessels must not anchor between this buoy and the white house on the shore or to the southward of the buoy. Early in 1890 all these buoys were adrift.

Bissao is in telegraphic communication with Bathurst, Sierra Leone, and isles de Los.

Bissao.—The fort of Bissao is now the site of the town. The Portuguese have a garrison there, consisting chiefly of convicts and mulattoes, except the officers, who are detached from the cape Verde islands, of which this settlement is a dependency. In 1869 Bissao was declared a free port. There appears to be no territory attached to the port. The whole island of Bissao has the appearance of being extremely fertile, and the population is proportionally great. It is divided among several independent chiefs, the most powerful of whom resides in the large native town adjoining the Portuguese fort, which contains 6,000 or 7,000 inhabitants.

Supplies.—The market is scantily supplied with the commonest necessities of life.

Fresh water.—A watering place on the beach a little westward of the fort consists of pits 3 or 4 feet deep, but their produce is so slow that not more than 30 barrels can be filled in a day, and it then requires to be filtered for drinking. It is, however, said to be wholesome and to keep well, which appears rather doubtful. There is another watering place on Passaro island.

Firewood.—Bissao is a bad place for laying in a stock of fuel, for though most part of the country is covered with forest, yet the natives are lazy and bring it with reluctance, delivering it at very high prices, and neither the climate nor the hostile disposition of the inhabitants will allow the crews of vessels to cut wood for themselves.

Tides.—It is high water, full and change, at Bissao, at 11h.; springs rise 8 feet. At the anchorage the eastern stream ends at 12h. 30m. At springs the tidal stream runs about 2½ or 3 knots an hour. Higher up the river the flood is said to rise 14 feet.

To leave Jeba river.—The vessel which has been brought up in the preceding pages to Bissao, by Jeba channel, will now be conducted to sea again by the southern or Orango channel; the links which connect those two great inlets being Arkas and Bulama channels and Kanabak reach.

Arkas channel.—The channel branches off from Jeba channel about 10 miles below Bissao, and is formed by Gancho banks to the westward and Arkas flat to the eastward. Its narrowest part is 1¼ miles wide, between a depth of 3½ fathoms on either side. There are 14 and even 16 fathoms in some parts of it, while in others only 5 fathoms will be found at low water; this unevenness in the bottom produces overfalls with the tides, which sometimes appear alarming. Along the edge of Arkas flat, parts of which dry at low water, the soundings are very irregular, but it may always be cautiously approached with two quick leadsmen in the chains.

The soundings on the western side of the channel are rather more regular, and the slope of the bank inside of the 5-fathom line more gradual. It is advisable to have a pilot. Vessels from the northward can get a pilot at Gorée. The channel was surveyed in 1846.

Buoys.—The buoys which formerly marked Arkas channel were all out of position in 1890.

Pedralva rocks.—These rocks are situated on the western side of Arkas channel, about a mile south of Gancho banks; the principal rock lies 7½ miles N. 37° W. (N. 17° W. mag.) of Bulama point; it shows a little after half ebb, and should be seen if possible by all strangers attempting to proceed through this narrow passage. To insure their being easily seen, these rocks are marked by a tripod beacon surmounted by a black ball, erected on the highest part, but it is not to be depended upon. The chief difficulty in navigating Arkas channel may be said to arise from its being so completely sheltered that the sea seldom breaks upon its rocks or banks.

Tides.—It is high water, full and change, at 10h. 10m. throughout the Arkas channel; spring tides rising from 11 to 14 feet, and neaps about 9 feet.

Directions.—In leaving Bissao road, in order to proceed to Orango channel or port Beaver, after rounding Passaro island, steer S. 25° W. (S. 45° W. mag.), allowing for wind and tide, so as to bring that island astern and apparently midway between Middleton point and Rey island, and therefore to bear N. 25° E. (N. 45° E. mag.). If that mark be preserved, the vessel will pass ½ mile NW. of Arkas flats, and will

advance in a direct line towards Pedralva rocks. When the principal tree of the grove of St. Martin bears N. 17° W. (N. 3° E. mag.) the vessel will be within 2½ miles of the beacon, and may then steer about S. 23° E. (S. 3° E. mag.) for Bulama point. Having reached within a couple of miles of that point, edge a little to the westward, and pass it at the distance of a mile, in order to avoid the shoal ground extending from it; and here, as well as in all parts of this channel, remember that the floods set to the NE. and the ebb to the SW., and therefore obliquely athwart the banks. The anchorage is good in most parts of the channel, though there are some deep holes and shallow spots, which last are probably indicative of foul ground in the vicinity; these shoals generally produce strong ripples. When any of the fierce tornadoes, which are so common on this coast, are seen approaching, vessels ought to anchor immediately; and if they are bound to Bissao, it may be useful to know that, if detained by wind or tide, their boats can communicate with that town by the pass to the eastward of Arkas island.

The buoys, if in position, are of great assistance in navigating the channel, but they are not to be depended upon.

Bulama island has a population numbering 4,000, who are an industrious set. The island is very fertile and is for the most part cultivated and grows maize, groundnuts, beans, mandioca, etc. Cotton trees are common and the mango thrives. Excellent fish may be caught.

Bulama point, the western extreme of Bulama island, has two conspicuous trees on it, and extending from it there are a few reefs which are steep-to; the point, however, may be safely approached to within a mile.

Dalrymple bay.—At 4 miles SE. of Bulama point, off Hacket point, some extensive reefs extend 3 miles to the southward; and between those two points, in a bight named Dalrymple bay, fair anchorage may be found in from 8 to 13 fathoms, sand and mud, with Bulama point bearing about NW. The anchor must be ready to let go on shoaling to less than 20 fathoms, for inside of 8 fathoms the bank is steep. If this anchorage can be taken without risk, it may be a convenient berth in which to wait for the tide, as the holding ground is good and there is but little tidal stream; water may be procured on the adjacent beach.

Bulama channel.—From midway between Bulama point and the NE. extremity of Gallinha island, the course through Bulama channel is S. 51° E. (S. 31° E. mag.) for a distance of 7 or 8 miles, or until within 4 or 5 miles of the low shores of Manteri island. This course equally avoids Hacket reefs on the eastern side, and on the other the eastern prong of the large shoal which seems to connect the islands of Gallinha and Kanabak; all these shoals are too steep to admit of much benefit from using the hand lead, for a large vessel ought not to pass within the depth of 16 or 17 fathoms.

Bolola channel.—The Bolola and Bulama channels join south of Hacket reefs; the former is the estuary of Bolola river and port Beaver. Bolola channel is narrowed by Beggars bank, extending from the south shore of Bulama island, several places on which uncover at low water.

Buoys.—All the buoys formerly marking this channel were adrift early in 1890.

Bulama, the seat of government for the province, stands on the site of port Beaver. The town is superior to Bissao and has some excellent barracks. Both towns are convict settlements.

The harbor is easy to approach, the anchoring ground good, and the shelter perfect, but shipping work is carried on under great disadvantages. A pile pier was begun in 1888.

Supplies.—Water may be procured with some little trouble on the island, but more easily near the SW. extreme of Biafres island, where there are three springs. Cattle thrive well, but it is difficult to procure meat.

Telegraph.—A cable connects the town with Bissao.

Mao bank and a shoal of 6 feet, one mile eastward of it, both of which are at the entrance to Bulama, may be passed to the southward by keeping the south points of Biafares island in line, bearing N. 62° E. (N. 82° E. mag.).

Bolola river, known to the Portuguese as Rio Grande, is reported to be navigable for a distance of 450 miles, the distance between the head of this river and that of the Gambia being accomplished on foot in a few days. There is very little trade on the river.

The main channel of the river lies southward of Bissagua island, and all danger will be avoided by keeping in mid-channel and well clear of the points.

A depth of not less than 9 fathoms is maintained for about 16 miles above Bissagua island, when it decreases to about 20 feet, mud, which is found off the French factories situated on the left bank of the river. Fourteen feet was carried up the river to 7 miles below Bowba, a Portuguese military station (1890).

Kanabak reach.—At the confluence of Bolola and Bulama channels, Kanabak reach may be said also to begin, and the mid-channel course through it, as far as Barel point, is S. 19° W. (S. 39° W. mag.) for about 15 miles. This point is higher than the rest of the island, and is also conspicuous from the red rocks of which it is formed. A small rocky islet about 10 feet high lies on the eastern side of Kanabak reach, opposite Barel point, distant 4½ miles.

In most parts of Kanabak reach, the soundings will indicate a too near approach to the shoals on either side.

Kanabak island is moderately high, with an excellent soil of decomposed lava; and the cattle upon it, though rather smaller in size, are

generally in finer condition than on the other islands of the Bijouga group. The eastern coast of the island may be safely approached by the lead, and everywhere offers a safe anchorage in from 10 to 8 fathoms, with good holding ground, and within a couple of miles of the shore.

Damiong bay.—Water may be obtained at Damiong bay, at the NE. side of Kanabak island, but it requires filtering or boiling before it is used, for the long pool from which it is baled is overhung by trees, and is therefore always filled with fallen leaves. Their decomposition gives it a disagreeable smell and taste, but it has been freely drunk without producing any ill effects. This pool lies parallel to the beach, through which it oozes, but it is kept at a uniform level by the abundant supply of some neighboring springs. Wells were also dug at a little distance from the shore, and they supplied pure and clear water. Wood may be obtained on all these islands, but at Damiong bay it may be cut and embarked with great facility.

Port Manel.—On rounding Barel point from the northward a small cove will be perceived between it and the little island of Pomp, affording good anchorage, though at low water rather shallow. It is named port Manel, and is apparently the rendezvous of all the canoes belonging to that side of Kanabak island.

Orango channel.—This channel may be said to extend from Kanabak island to South breaker, upwards of 40 miles. Its least breadth (between Bronco reef and Cavalho spit at its northern entrance) is 5 miles; but the distance between Pullam shoals and the ridges connected with the South breaker being 13 miles, it offers a broad estuary through which the stranger may work with perfect security, provided he pays attention to the tides, has the leads in hand when nearing either side of it, and adopts the useful precaution of keeping a lookout from the masthead for ripples or discolored water.

From abreast of Barel point a S. 33° W. (S. 53° W. mag.) course, due attention being paid to the tide, will lead out to sea through Orango channel.

Jamber group.—The islands of Jamber, Cavalho, and Mel are on the eastern side of the channel; they are of nearly equal height, and the latter shows some extent of a white sandy cliff. The northern extreme of this group is less dangerous to approach than the shoals on the western side of the channel; for Cavalho spit, lying north of Cavalho island, dries at low water, and almost always breaks, and the two small rocks near it are less than ½ mile from its edge.

Jamber pass.—Between Mel and Jamber islands there is a narrow deep channel, named Jamber pass, but it is not likely to be taken by any stranger.

If circumstances should render the attempt necessary, the best time would be after the last quarter ebb, as many of the dangers in it would then be visible; but even then it would be prudent to send a couple of boats ahead, to mark the projecting points of the reefs on either side, which may at that time be readily perceived by the ripples caused by the tide.

Caution.—All these channels were surveyed many years ago, and as changes in them must have occurred the charts must be used with caution.

Pullam island, so named from the lofty pullam trees growing on it, is the southernmost of the Jamber group, and the best landmark for the southern entrance of Orango channel. It is very small, but the reefs and foul ground by which it is surrounded extend for 6 miles to the southwestward, within the depth of 3 fathoms, and 4½ miles to the northwestward; these shoals, known as Pullam shoals and Bicho bank, form the eastern side of the south entrance of Orango channel. The whole space occupied by Jamber group is full of dangers, and should be avoided, or very cautiously approached. In some places the depths decrease in a single cast of the lead from 24 to 5 fathoms, or even less.

Bronco reef.—Along the western side of Orango channel there are several dangers. Bronco reef, on part of which there are but 6 feet at low water, with 8 and 16 fathoms within 400 yards, lies 5 miles N. 64° E. (N. 84° E. mag.) of cape Cameleon, and is nearly a mile in length. A quick leadsman will give sufficient warning when approaching this reef, but in clear weather Barel point, kept half a point open to the eastward of Sueste point, the south extreme of Kanabak island, bearing N. 39° E. (N. 59° E. mag.) will lead east of it in deep water.

Pipon patch lies west of the above line of bearing, and, though carrying but 12 feet, may be safely approached by the lead; its eastern extreme is situated 2½ miles southwestward of Bronco reef.

Cape Cameleon, the SE. extremity of Orango island, is of a yellowish color and moderate height, it is readily recognized when seen from the southward.

Cameleon reefs project in a SE. direction nearly 2 miles from Cameleon cape; but being far within the fairway track through the channel, no vessel is likely to approach them nearer than 10 or 12 fathoms, in which depth she should tack.

Orango reef, on which the sea always breaks very heavily, extends to the SSW. for 10 miles from cape Cameleon. The ground shoals somewhat suddenly up to its eastern edge, the tides set rather sharply around it, and in some places across it, but the appearance of the broken water on it is quite enough to keep all vessels at a distance.

Ætna patches.—At a distance of 18 miles S. 48° W. (S. 68° W. mag.) of cape Cameleon and 10 miles S. 64° W. (S. 84° W. mag.) of the tail of Orango reef, there are several long ledges of rocks, and at 3 miles farther

to the westward some sand banks, which dry a low water, and are named the Ætna patches.

South breakers.—To the southward of these shoals there are other banks and dangers, amongst which no vessel should venture; and at 10 miles south of Ætna patches there is a shoal on which the sea at all times breaks heavily. It is believed to be at the southern angle of the great triangular bank on which the Bijouga islands stand, and when made by vessels approaching from the southward, serves for a guide to the Orango channel or for a point of departure to those that have come through it from the northward. Its southernmost head, of 4 fathoms, is situated in latitude 10° 39′ N. and longitude 16° 9′ W.; it is 22 miles southward of the nearest land (Orango island) and 28 miles S. 61° W. (S. 81° W. mag.) of Pullam island. Though no dangers were discovered to the southward of South breaker, yet there are some suspicious soundings; and as detached rocks and isolated shoals are numerous in this vicinity, the mariner is advised not to round it in a higher latitude than 10° 35′ N. About 9 miles eastward of the above mentioned spot the water shoals to 6 fathoms and the sea breaks heavily.

Tides.—It is high water, full and change, in Orango channel at about 10h.; springs rise 11 feet; the ebb stream seldom exceeding 2½ knots an hour in velocity, except after violent freshets in the rivers, and the flood seldom exceeding 1½ knots, the general direction of the flood stream being to the NE. and the ebb to the SW.; constant watching and verifying the position of the vessel on the chart are imperative, as in some parts the tidal stream sets across the channel and over the shoals.

Off the mouth of Orango channel the flood stream sets NE. and the ebb SW., for a duration of six hours each way, with a strength of from ½ knot to 1½ knots per hour.

Alcatraz island lies S. 57° E. (S. 37° E. mag.), distant 26 miles from Pullam island; it is a volcanic rock 40 feet in height, traversed by deep fissures, and is the abode of innumerable boobies. Wreck island, low and sandy, lies one mile SW. of Alcatraz island, with shoal water between them. Reefs and foul ground extend to the southwestward from Alcatraz island for 7 miles, and for a distance of 5 miles to the westward; the western portion, known as Alcatraz reef, partially uncovers. In 1858 H.M.S. *Spitfire* struck on a shoal with 6 feet on it, lying S. 43° E. (S. 23° E. mag.), distant 1½ miles from Alcatraz island.

Unsurveyed coast.—The extent of coast between the Bolola and Componi rivers does not seem to have been visited by either the Portuguese explorers or by the French or English surveyors. It is so low as to be seldom visible to vessels proceeding through Orango channel to Bissao.

This unknown coast, extending from Tombali cape to Tristão islands, occupies a space of about 40 miles in length, and lies from 10 to 20 miles

eastward of the Jamber and Alcatraz islands, and those reefs which have been already described.

Kassini river.—The entrance to this river, which is situated about midway between Kanabak reach and Componi river, was partially examined by the French in 1857; it is obstructed by a great number of islets and sand banks. There is a factory on the southern bank of the river at 10 miles within the entrance.

Componi shoals.—These shoals from the western side of the bay which receives the waters of the Componi and Nuñez rivers; they terminate to the southward in Conflict reef.

Conflict reef.—This extensive reef is composed of numerous rocky and sandy dangers, some above and others below water. From the reef two long and dangerous prongs project, one to the southeastward and the other to the southwestward, and vessels should approach them very cautiously either at night or in thick weather. The south edge of the western prong, where it terminates in 5 fathoms, lies in latitude 10° 23′ N. with Alcatraz island bearing N. 20° W. (north mag.), distant 16 miles, and cape Verga S. 77° E. (S. 57° E. mag.), distant 48 miles; the southern prong bears S. 88° E. (S. 68° E. mag.), distant 12 miles from the western prong.

Rocky head.—This dangerous shoal lies 6 miles S. 14° W. (S. 34° W. mag.) of the extremity of south prong; it carries only 15 feet water, from which Gonsalez island bears N. 62° E. (N. 82° E. mag.), distant 27 miles.

Caution.—As other isolated knolls probably exist, no vessel without great precaution should borrow on Conflict reef within 14 fathoms, especially on the line of its apparent prolongation.

The same vigilance should be exercised in every part of the bight between Conflict reef and cape Verga, and when in the offing of that bight, a vessel working along the coast will perhaps find it more prudent during an adverse tide to anchor instead of persevering in making a number of boards, which can avail but little against the stream, but which will expose her to the chance of picking up some undiscovered pinnacle of rock.

Gonsalez island.—At about 24 miles eastward of the south prong of Conflict reef is the small island of Gonsalez. It may be seen from the deck of a vessel from a distance of about 6 miles, and forms the southeastern point of the entrance into Nuñez river. There are two other islands (Broat and Dapecará) to the northward of Gonsalez, and between them and the mainland there is a narrow channel, named by the natives Broat river.

Gonsalez flat.—These islands are fronted by a dangerous flat of rocky and gravelly ledges, 1½ miles in breadth, and extending 8 miles southwestward of Gonsalez island. One part of this flat, 4 miles S. 22° W. (S. 42° W. mag.) of that island, dries 6 feet at low water, and shows its

bare volcanic structure for ¾ mile in length; several shoals in the vicinity of this reef break during a fresh breeze.

Componi river.—The entrance to this river is between Conflict reef and the extensive banks and shoals extending about 13 miles SW. of the coast between Componi and Nuñez rivers; the main channel trends north and south, but owing to frequent changes in the depth, the navigation is difficult and dangerous.

From the south prong of Conflict reef, the entrance to Componi river bears N. 42° E. (N. 62° E. mag.), distant 21 miles; a portion of the bank on the western side of the entrance always breaks.

The river may be ascended for a considerable distance, but owing to the difficulties attending the navigation of the entrance it is unfrequented.

Coast.—Between Componi and Nuñez rivers are the mouths of two unfrequented rivers, the eastern of which is known as Kassagua river.

Nuñez river, the entrance to which is 10 miles south of Componi river, has been traced to its source about 50 miles inland. On its banks are established numerous French factories, the principal of which is Victoria, or St. Eugenie, situated on the northern bank at 13 miles from the entrance. The climate of this river is extremely unhealthy, especially during November and December, when thick fogs prevail. Alligators abound.

Supplies.—Coal may be procured at Belair factory, which has communication with Sierra Leone by means of a small steamer. Cattle and sheep may be bought, the former of good quality and cheap. Spring water is seldom to be obtained, but the river water is fresh.

Talabuncha point, the northern entrance point of Nuñez river, is elevated and thickly wooded, appearing to be detached from the adjoining land. A bank of muddy sand, uncovered in many places at low water, extends 2 miles SSW. from Talabuncha point.

Broat and Dapecará islands, on the southern side of the entrance, are covered with tall trees, their shores being fringed with mangrove bushes. Several rocks, above water, lie off the north extreme of Broat island.

Making the land.—Vessels bound into Nuñez river would naturally endeavor to make the high land of cape Verga, but this can not be safely done unless the weather be sufficiently clear to render it visible from a distance of more than 10 miles; for at 8 miles to the westward of the cape there is a long dangerous shoal, named Verga ridge, lying nearly parallel to the shore, and carrying in some parts only 9 feet water. Even in clear weather the cape should be very cautiously approached, as the soundings in the offing have not been closely examined.

Directions.—Whenever cape Verga can be distinctly made out by a vessel approaching from the SW., a direct course may be steered toward the mouth of Nuñez river, but a vessel coming from the northwestward should take a departure from Alcatraz island, and endeavor to sight the breakers

on the prongs of Conflict reef. Be sure also of having reached the latitude of 10° 20′ N., and by keeping on that parallel till the meridian of 15° W. is reached, the vessel will have passed between Conflict reef and Rocky head, and may then steer for Gonsalez island, which will generally be seen from the deck when distant about 6 miles. At every cast of the lead the navigator must be prepared for great irregularity in the soundings, and should, under manageable sail, keep the leads constantly going. If Gonsalez island can be approached on an N. 70° E. (east mag.) course, the water will suddenly deepen to 10 or 12 fathoms at 6 or 7 miles from that island, and will again quickly shoal to 7 fathoms, but by this time the land will be distinctly seen, when haul in towards the mouth of the river, steering about north; strangers should not attempt to enter Nuñez river without a pilot.

The reefs off Dapecará island extend farther to the westward than marked on the present charts; Sand island in line with Zebre point leads clear to the westward of them.

Nature of bottom.—"Keep in the mud," which would be almost sufficient to guide a vessel in all the rivers in this vicinity, is at the mouth of Nuñez river of more than common value from the shifting nature of the spits and sand banks, as they yield alike to the floods from within and the gales from without.

To enter.—In a steamer of 14 feet draft, bring cape Verga to bear S. 65° E. (S. 45° E. mag.), and Gonsalez island N. 31° E. (N. 51° E. mag.) which will place the vessel 1¾ miles southwestward of the SW. edge of the bank extending from Gonsalez island; then steer N. 11° E. (N. 31° E. mag.) for 12 miles, or until the break between Gonsalez and Broat islands bears S. 43° E. (S. 23° E. mag.); then alter course to eastward, looking out for the reefs off Dapecará island, and proceed in with caution.

Sand island lies at the entrance of Nuñez river, between Talabuncha and Talabajli points. It is the head of the shoals that form the western side of the channel, and, from the shifting nature of the sands, has at different times assumed various dimensions. In 1834 it was described as having a large space upon it available for encamping the crew of a vessel, and producing live timber, palms, etc.

In 1848 it was a flat at half tide, and in 1858 it was described as merely a low flat of sand nearly level with the water, having a few shrubs on its SW. side.

Village point, 5 miles above Sand island, has three large trees upon it that may be seen for a distance of 14 miles.

Anchorage.—A good berth is in 7 fathoms, with Sand island in line with Talabuncha point bearing N. 76° W. (N. 56° W. mag.), distant ½ mile.

To proceed up the river.—From a berth ½ mile southeastward of Sand island, a course N. 19° E. (N. 39° E. mag.) for 5 miles will lead up nearly

in mid-channel to abreast Village point, whence to Ropass (Rappace) there is no danger. By keeping nearly in mid-channel, nothing less than 3 fathoms will be found, and the difference in the soundings from the chains will indicate which bank of the river is being closed; the bottom is of sticky mud.

The river winds through a mangrove-covered country, with a long island on the eastern side, and passes many native villages, until arriving at Ropass factory, on the north bank of the river, which forms a reach just above it. There is a flat of rocky ground extending from the southern shore nearly across to Ropass, which is impassable, except at high water. Vessels should anchor in the center of the stream about ¼ mile below Ropass, and if to remain should certainly moor. Higher up the river it is necessary to moor head and stern, laying a stream anchor out astern against the flood. The *Grappler* proceeded as far as Kassasez, 70 miles from the entrance and 5 miles from Debukko, where she lay in the mud in 2½ fathoms at low water, and had it been necessary might have reached as far as that latter place, grounding, however, at low water. Debukko is the residence of the principal chief of the river, and stands on a commanding eminence on the eastern shore; beyond this, it is said, boats can not proceed far. During February the tide in the upper part of the river was found to ebb 8 hours and flow 4 hours, the rise being about 8 feet. The bottom is generally stiff mud, and banks steep, but soft, and the few rocks in the river may be suspected from the appearance of the shore. The wet season commences in May and ends in September, during which time the stream of the river is very rapid, and towards the close of the season, as the water subsides, the Nuñez is very unhealthy.

Anchorage may be obtained in Nuñez river off Victoria, 13 miles from Sand island, in 7 fathoms; or off Ropass factory, 35 miles from Sand island, in 4½ fathoms, with center of Ropass bearing N. 9° W. (N. 11° E. mag.).

Tides.—It is high water, full and change, at Sand island at 10h.; springs rise 15 feet, neaps 11½ feet.

Kappatches river.—At about 5 miles east of Gonsalez island the entrance to Kappatches river will be seen; but as there were but 2 fathoms at 4 miles in the offing, within which the sea broke heavily, and, as the volume of water appeared to be small, it was not considered worth the labor or risk of further examination. It is, however, said to be a trading river, the traffic being carried on by canoes and local vessels, drawing not more than 4 feet.

Verga ridge.—The coast from Gonsalez island to cape Verga forms a wide bay, though with such shallow water in it that no vessel should venture in. At about 7½ miles west of cape Verga the ridge terminates in 2¾ fathoms, after, extending without intermission for 16 miles in a southerly direction from the mouth of Kappatches river. It has possibly some offlying shoals,

and it forms on either side two open bights, in which vessels should be careful not to get embayed.

Cape Verga can not be mistaken, for, unlike all the adjacent shores, it rises at once from its base into high land, and when seen from the southward, in connection with a conspicuous eastern range of hills, is one of the most remarkable landmarks on the whole coast. It terminates in a rocky point inaccessible to boats, but with no offlying islands or mangroves. Southeast of cape Verga the shore resumes its low and swampy character. For a distance of 17 miles as far as the western entrance of the Ponga river, it is fronted by a shallow bank, the 3-fathom edge of which for a considerable distance lies 7 miles seaward of the beach.

When cape Verga bears N. 70° E. (east mag.), distant 13 or 14 miles, two conical elevations lying about 1½ miles north of the cape will be seen. The eastern of these is isolated and shaped like a sugarloaf; the western is the commencement of a chain which terminates in the interior in an isolated hill with two summits close together.

Ponga river.—The Ponga is a river of some magnitude, and, like most of the rivers on this flat coast, it diverges near its mouth into several branches. The most considerable of these are known as the Sand bar and Mud bar, besides which there are three other channels—two lying NW. of Mud bar and one SE. of Sand bar. Canoes pass freely from one to the other, by keeping within a line of breakers, which fronts the shore at the distance of about a mile.

Mud bar lies S. 71° E. (S. 51° E. mag.), distant 17 miles from cape Verga, and is ⅔ mile wide. Pilots may sometimes be obtained, but if not, though there is a scarcity of marks, yet by attention to the constant breakers on either hand the channel can hardly be mistaken, and may, if necessary, be attempted at three-quarter flood by any vessel drawing less than 15 feet.

The bar is composed of soft mud, into which the lead sinks deeply.

Directions.—Being in 4 or 5 fathoms, or at a distance of 7 or 8 miles in the offing, bring the entrance of the river to bear N. 33° E. (N. 53° E. mag.), which course will lead midway between the two sand-banks that extend 3½ miles outside it, and, if exactly preserved, will cross the bar into a depth of 4 fathoms; but it must be recollected, when leaving the river by Mud bar, that although the flood sets directly *in* through the channel, yet the ebb sets obliquely *out* to the southward, across the easternmost of the two banks at the entrance, both of which are steep. These directions, if the compass be good and the lead kept quickly going, will conduct any manageable vessels across the Mud bar, provided the maxim *keep in the mud* is borne in mind.

Sand bar.—The Sand bar mouth of the Ponga river lies about 7 miles southeastward of the Mud bar. Observation point, which forms the north side of the entrance within the bar, terminates rather abruptly; Murura

point, the south entrance point, is more shelving. Both east and west of the bar the great bank with which it is connected extends considerably farther from the shore, and the many shallow spots on it give the appearance of an almost continuous line of breakers, so that no one who approaches it when the tide is low, will feel any inclination to attempt to cross it much before the top of high water. Neap tides rise here 9 feet, and therefore, if there be a moderate breeze and no great swell, any vessel drawing less than 15 feet may venture at a three-quarter flood, if no pilot offers himself, by attending to the following directions.

Directions.—The river is about 700 yards wide at the entrance, fronted by a dangerous bar, on which the least water is 6½ feet. At three-quarter flood (remembering that the flood stream sets obliquely across the channel to the northward), and with leadsmen in both chains, bring Observation point to bear between N. 31° E. (N. 51° E. mag.) and N. 33° E. (N. 53° E. mag.) and keep it on that bearing till the first cast of 16 feet (allowing for the rise of the tide) shows that the vessel has arrived on the outer edge of the bar; then alter course so as to bring the NW. shoulder of mount Mayondi a little east of Murura point, and run on that line for about a mile, which will lead across the bar in 14 or 15 feet (at low water). On obtaining the first cast of 3 or 4 fathoms, steer again for Observation point, keeping a good lookout for knolls of sand, which sometimes form in the channel. Two miles on this latter course will have led past the shallow banks on the northern side, and the vessel will be safe in a broad and deep channel. Keep Observation point bearing half a point on the port bow; it is steep-to on its eastern face, and may be passed at a distance of 100 yards, and a good anchorage may be then taken near the point at pleasure.

Anchorage off Ponga river.—Vessels of war usually anchor off the Sand bar in 7 or 8 fathoms, but in thick weather it is difficult to distinguish the entrance from that of the Mud bar. The south entrance points of each being formed by bluffs, are very similar. The leading feature is mount Mayondi, a truncated cone with gently sloping sides, 1,300 feet high, and the most conspicuous of a chain of inland hills. Failing Mayondi, Observation point will serve as a guide.

Tabuia.—This town, the capital of the Kolea district, is about 2 miles from the mouth of the southern arm of the Ponga river, and may be easily recognized from seaward by some high cotton trees rising above the low coast.

The town is built upon a high bank at a sharp curve in the river, and concealed by a grove of palms; behind the town are the high cotton trees mentioned above. The king's residence is a kind of fort, with thick walls of clay 13 feet high, surrounding some huts, a council hall, and a small powder magazine. Many of the natives are armed with rifles and swords.

Bangalong.—To proceed up the river to the town of Bangalong, 21 miles above Observation point, a pilot is required; but if none can be had, and circumstances require despatch, a vessel, by keeping the northern shore aboard, may safely proceed as far as Ismir point, on the east side of the river 2¼ miles north of Observation point, and then, with a skillful use of the lead, a couple of boats, and a flowing tide, no great difficulty will be found in reaching the town of Bangalong.

Dominghia, 5 miles above Ismir point, on the west side of the river, is the headquarters of the French customs, off which place anchorage may be had in 9 fathoms.

Caution.—After all, however, that has been said of these two bars or entrances to the Ponga river, it is necessary to remind the mariner that it is some years since they were examined (1830), and that there is good reason to believe that every gale and every rainy season alters more or less the form and extent of all their banks and shoals. Therefore neither Ponga nor Nuñez rivers should, under any circumstances, be entered by a stranger without a pilot.

Supplies.—The resources this river affords are trifling; neither bullocks nor vegetables are to be obtained. Other stock is scarce, and only to be procured in exchange for rifles, ammunition, tobacco, handkerchiefs, etc., money being of no use. For water, which is not good, boats must proceed a long way up; but wood may be easily procured at Observation point, as the trees there grow nearly to the water's edge, and boats can lie conveniently alongside the sandy beach.

Tides.—It is high water, full and change, at the entrances of Ponga river at 7h. 30m.; springs rise 12 feet, neaps 9½ feet; the strength of the tidal streams is about 1½ to 2½ knot s an hour, except during the period of floods (July–September), when it is much greater.

Dembia, or Brameya, river.—From the sand bar of Ponga river the coast, formed by a low shore fringed by mangroves with a detached line of breakers, trends SE. for a distance of 20 miles to the mouth of the Dembia river. This river divides into two arms at about 10 miles from the sea, enclosing the island of Konebombi between them. The northern arm empties itself into the sea, but is reported to be only navigable for boats. The southern branch flows into Sangaria bay. At the junction of the two arms is an island named Kakunzu, near the mouth of the southern arm, which must be left on the port hand when going up the river. Near this island is a rocky ridge named the Kakunzu reef, over which vessels drawing 10 feet may pass at half tide. With this exception the channel is clear and keeps in midstream.

Vessels drawing 16 feet can navigate the Brameya as far as the town of that name, some 15 miles above the Kakunzu reef, where there is an extensive rocky ridge across the stream, forming the Bumia falls, which

completely bars further navigation. Both banks of the river are covered with thick mangrove forest, intersected by numerous creeks only accessible by flat-bottomed boats. Alligators abound.

According to the statements of the white residents at Debreeka, the Brameya is navigable above the falls as far as 160 miles for vessels drawing 10 feet.

Brameya, or Bumia, the capital of the district of the same name, is on the right bank of the river just below the falls. There are English and French factories on both sides of the river, belonging to the head settlements of the Europeans on the Debreeka river, and regular communication is kept up between them by boats and two small steamers of 100 and 30 tons, drawing 10 and 7 feet respectively.

Kakulima mount.—The paps of Soumba lie ENE. of the mouth of Dembia river, and on that bearing this mount will be easily recognized; the paps rise from a range of high land to 1,700 feet above the sea; and mount Kakulima, 11 miles farther SE., attains the height of 2,900 feet; it is a conical peak with steep and regular sloping sides. This group of hills covers a large space and may be seen from a great distance.

Konebombi bank.—One side of a triangular mud bank, which dries at low water, extends from the south entrance point of Dembia river, about 5 miles to the southwestward, the edge of the bank then trends towards the shore of Konebombi island, the western angle lying N. 71° W. (N. 51° W. mag.), distant 6 miles from Alligator point, the south extreme of Konebombi island.

Sangaria bay.—Konebombi island and bank forms the NW. side of Sangaria bay, into which the Debreeka river pours the water of the mountainous region above mentioned. The SE. side of the bay, 20 miles in length, extends from the mouth of that river to Tumbo point, southwestward of which, distant 2 miles, are situated the isles de Los (Idolos). Extensive flats and shoals project into the bay from each side, leaving only a 2½-fathom channel between them at low water; the shores of the bay are so intersected with creeks that they form a series of islands, some of which are forming while others are disappearing; great caution should be exercised when crossing the entrance to Sangaria bay.*

Jatia river.—This is another river flowing into the Dembia near the point where it opens into Sangaria bay. The town of Jatia, the capital of the Kabitai district, is situated on the southern bank about 6 miles from its mouth. At Jatia the river divides into two branches, that on the right leading to the town and falling dry at low water.

* The depths marked on Admiralty chart No. 600 appeared to be generally correct; but the bank shown in the middle of the entrance of the bay was not seen by the officers of the German corvette *Ariadne*, nor is its existence known to the captain of a small trading steamer, who has been navigating these waters for many years.

The flood tide sets in here about 1½ hours later than at Alligator point, and runs with such strength that a pilot is necessary.

Depth.—The river appears to be navigable for vessels drawing 10 feet as far up as Jatia.

Debreeka river.—Debreeka river divides into two branches before entering the NE. corner of Sangaria bay, inclosing Coppera island.

Above the junction of the two arms is a European settlement on the left bank, which is named Debreeka, consisting in 1888 of two English, one German, and two French factories.

Depth.—The southern arm is the deepest, and can be used by vessels drawing less than 10 feet at all times of tide; but the northern, which is shorter, is only navigable after half flood, as there are several banks and reefs near the upper point which dry in places at low water.

Only boats can navigate above the settlement, as the river shoals rapidly with many rocks and banks.

Debreeka is rather a commercial station. The caravans of the interior visit it in large numbers, bringing India rubber, gum, skins, ivory, etc.

Supplies.—Oxen and sheep are to be procured. Fruit is not in abundance. Fish are plentiful in the river.

Directions.—Should a moderate-sized vessel wish to enter this river, bring mount Kakulima to bear N. 70° E. (east mag.); and timing the run upon that course, so as to be as far in as the 4-fathom line by half flood, proceed until abreast of Alligator point, the north entrance point, which should be passed at the distance of about 2 miles. When this point bears N. 31° W. (N. 11° W. mag.), alter course a little to the northward, so as to bring the extremity of the ridge, which lies westward of mount Kakulima, in line with the termination of the sandy beach on the southeastern shore. The water will now deepen a little, and passing Creek point, the south entrance point, by the lead, take up an anchorage at such a distance from the mouth of the river as may be convenient; or by sending a boat to mark the edge of the bank on the south side of the river, it may be entered without much danger. The water here is unfit for Europeans and very scanty, but wood will be found everywhere.

To proceed from the mouth of the Debreeka to Brameya, steer for Alligator point until Creek point bears S. 25° W. (S. 45° W. mag.), and then alter course for the east point of center Konebombi island until the mouth of the Brameya opens out to starboard. This course leads westward clear of the banks extending from the south side of Bora-Banki, the island lying at the head of Sangaria bay.

Soundings.—The bottom along the coast from the Dembia to isles de Los, under 10 fathoms depth, is soft blue mud, into which the lead sinks easily. When the depth of 5 fathoms is reached the water becomes so thick on the surface as to lead one to imagine that the vessel is stirring up

the bottom. The muddy tinge of the shoal water is of much lighter shade.

Tides.—It is high water, full and change, on the Ponga coast, at 7h. 30m. the current of the flood sets to between NE. and NNE.; that of the ebb to SW. and SSW.; the rate is from one to 1½ miles an hour, and sometimes greater in certain localities. The direction of the current is modified off the mouths of the largest rivers. It has been remarked that during the months of October and November the current off the Ponga river sets to the NE. and NNE. during several days in succession. Although the depth of water indicates the usual gradual rise and fall of the tides, the direction of the current is not reversed. This phenomena occurs very often during these months.

Fogs.—Fogs are of daily recurrence during the last part of the autumn on the coast of Ponga as well as the Bissagos archipelago. They are very thick, and last until half past 10 or 11 o'clock in the forenoon. The depth of water and quality of the bottom must be constantly ascertained by vessels on soundings, in order to navigate in safety.

Seasons.—The fine season on the coast comprised between cape Roxo and the isles de Los lasts from the middle of November until the beginning of May; the rainy season from the middle of May to the commencement of November.

Winds.—Calms are very frequent during the fine season to the southward and eastward of the Bissagos. During the morning there is usually a gentle breeze from between east and NNE. near the coast. It commences before sunrise and lasts until 9 or 10 a. m. The sea breeze from between SW. and NW. seldom commences until noon or 1 p. m. It is often very fresh, and sometimes turns into a gale, causing a short and ugly sea, which is dangerous for small vessels. Rain is almost continuous, and falls in great quantities, particularly in July and August. Tornadoes prevail from the end of April to June. There is then an interval of about two months, after which they return about the middle of September and last until the end of October, but they rarely occur every day. In the month of October the mountains of Sumba, Kakulima, and cape Verga are visited by daily and almost continuous storms. The rain sometimes continues until November, but only at intervals. The harmattan prevails on this coast from December to February, and is often violent.

The navigation of the coast of Ponga, during the months of July and August, is considered dangerous, because there is no shelter against the SW. winds, except the anchorages of the Los islands. Large vessels may, however, anchor everywhere, and this can usually be done without any inconvenience.

CHAPTER V.

ISLES DE LOS (IDOLOS ISLES) TO SHOALS OF ST. ANN.

Isles de Los.—This group consists of three moderately high islands, besides several bare rocks and reefs, situated 2 miles southwestward of Tumbo point, the southeastern limit of Sangaria bay. The islands are British.

Caution.—It has been reported that a disturbance of the compass needle has been experienced by vessels in the *close* neighborhood of these islands. Mariners are cautioned accordingly.

Tamara, or Futabar, island, the westernmost and largest of the group, makes like two islands, and being 465 feet high, may be seen from a distance of 20 miles in clear weather. The island is thickly wooded, 5 miles long, and about a mile in breadth, its curved form adds to the shelter it affords to the anchorage on the east side. Eastward of Topsail point, the south extreme of Futabar island, are two high conical rocks, the eastern of which is 800 yards from the shore.

There is a village near Barrette point, the NE. extreme of this island.

Arethusa reef projects about 600 yards from the northern extremity of Futabar island.

Factory island, the easternmost of the group, is 4½ miles in length, in a north and south direction, and in some places not more than ¼ mile across; it is concave on its western side, and forms the eastern limit of the anchorage. North hill, about 460 feet high, is ½ mile from its northern end.

Two small villages, Fanin and Mangortown, where a few fowls can be obtained, are situated in the northern part of Factory island. In January, 1886 only one factory was at work, a white house with red roof near the center of the island on its eastern side and northward of Kasso, the principal village, where the collector of customs resides. Good landing can be obtained at a small stone jetty abreast of the white house.

Cooper rock, awash at low water, lies 1,200 yards eastward of the south extreme of Factory island; a shoal of 3 fathoms lies 400 yards eastward of Cooper rock.

White island and Kid island, both wooded and nearly joined by a ledge of rocks, are separated from the southwestern extreme of Factory island by a narrow channel, only available for small vessels.

Ruma, or Crawford, island is about a mile long, in an east and west direction, and lies nearly in the middle of the space enclosed by Tamara and Factory islands. An extensive shoal, 2 miles long, extends to the northeastward from this island, and apparently blocks the passage between it and Factory island. As Crawford island is uninhabited it is a good

place on which to haul the seine, or for vessels of war to land men for exercise. The observation spot is in a bay on the north side, in latitude 9° 27′ 24″ N., longitude 13° 48′ 30″ W.

The sand bank north of Crawford island and between that island and Factory island is an excellent position for placing a vessel for examination of valves, copper, etc.

A sunken rock lies about 300 yards southwestward of the southwestern extreme of Crawford island, and a rock above water lies near the shore north of the highest part of the island.

Coral island lies 1¼ miles S. 43° E. (S. 23° E. mag.) of the south extreme of Futabar island; a reef of rocks lies ESE. of Coral island, distant ¼ mile.

North channel is about 1½ miles wide, between the northeastern extreme of Futabar island and the northwestern extreme of Factory island; the depth midway is 7 fathoms, but the entrance points should not be approached nearer than 600 yards.

Directions.—Vessels intending to enter the anchorage between Crawford and Futabar islands from the northward, should as soon as the north peak of Factory island opens well clear of the north extreme of Futabar island, distant about 3 miles, and the passage between Tumbo point and Factory island appears open, endeavor to make good an N. 84° E. (S. 76° E. mag.) course, allowing for a tidal set of 1¾ knots an hour (whether flood or ebb), until the NW. and SW. extremities of Factory island are in line, bearing S. 17° E. (S. 3° W. mag.). Then the eastern extremity of Coral island, in line with the western extremity of Crawford island, bearing S. 22° W. (S. 42° W. mag.), becomes the leading mark, until south of Barrette point, when the marks should be kept a little open, or the vessel steered for the middle of the channel between Topsail point and Coral island, to avoid the shoals extending NE. from Crawford island.

South channel is between the south extreme of Futabar island and Coral island, distant 1¼ miles from it; there are 8 fathoms in mid-channel, but the western shore should not be approached nearer than ½ mile when Futabar island south extreme bears to the westward of S. 81° W. (N. 79° W. mag.).

To enter by South channel.—Steer in with the northernmost peak of Factory island in line with the northwestern extreme of Crawford island, bearing N. 45° E. (N. 65° E. mag.), until the south extreme of Futabar island bears S. 81° W. (N. 79° W. mag.), when a course may be shaped for the anchorage.

Tides.—It is high water, full and change, at Crawford island at 6h. 35m.; ordinary springs rise 13 feet, equinoctial springs, 17 feet. If approaching from the westward it is advisable to enter by North channel with the ebb, and by South channel with the flood.

The flood stream sets to the NE., and the ebb in a contrary direction.

Anchorage.—The anchorage between Futabar and Factory islands is in 5 fathoms, about one mile or more north of the west extreme of Crawford island, or midway toward Futabar island, but very safe and convenient anchorage may be had, NE. of the north extreme of Factory island, at 600 yards off shore, in 4 fathoms, with the eastern extreme of Factory island bearing S. 20° E. (south.mag.), and the north extreme of Futabar island bearing N. 79° W. (N. 59° W. mag.).

Water.—The best water on Futabar island is to be obtained at the landing place on the east side, at one mile south of the NE. extreme of the island, but it can not be embarked after three-quarters ebb, and during the rainy season the swell at the anchorage renders watering with boats dangerous. Very good water may at all times be easily procured, from a pool 6 or 7 feet deep, at the beach under the north peak of Factory island and also near Sharks Nose point on the east side of that island.

Tumbo channel.—Between the isles de Los and the sharp low point of Tumbo there is a safe channel, available for vessels drawing 12 feet, and much time may be saved by using it, provided the tide be favorable. The bottom, being of mud, affords good anchorage if necessary. Some shoal water off the NE. extreme of Factory island will be avoided by keeping Sharks nose open east of Mat point, the next point to the northward of it. The mail steamers, drawing about 19 feet, use this channel. The deeper water appears to be on the eastern side, but avoiding the rocky ledge of the SW. part of Tumbo island. Still, without some good reason for hugging the shore, it will always be advisable to pass outside the isles de Los.

Tumbo island is flat and is separated at high water springs from the mainland by a narrow and rocky channel, through which nothing but canoes can pass.

Konakri and Bulbineh.—Konakri, the factory of the Senegal company, and Bulbineh, the factory of the Deutsche Afrikanishe Gesehaft, are situated respectively at the north and south extremeties of the western part of Tumbo island.

Telegraph.—The telegraph station is about midway between these points. The cable is laid in a northwesterly direction, passing about 2 miles to the northward of the isles de Los. Telegraphic communication is established with Gorée, Senegal, cape Verde, Tenerife, and Cadiz. Two iron buoys are moored to the northward of the cable and two to the south of it, to warn vessels from anchoring near it.

Anchorages.—Large steamers lie about 1½ miles off Konakri, but with a strong tideway between them and the shore. Vessels drawing more than 16 feet should anchor off Factory island.

Caution.—Konakri should be approached with caution, as the place has been only partially surveyed.

Buoys are occasionally placed, but no dependence can be put upon their being in position.

Vessels are advised to take a pilot when going to this anchorage, as there is a risk of grounding on a sand bank lying to the northwestward, on which the Senegal company has placed a warping buoy.

Tides.—It is high water, full and change, at 6h. 37m.; springs rise 14 feet; neaps 7 feet. The tides are very regular, but the streams are not so. The flood comes from SE., runs round the SW. point of the island, then NE. through the port, 3 knots at springs. There is an eddy in shore about 200 yards wide.

Supplies.—Coal can be purchased from the French company; oxen, sheep, fowls, and eggs can be obtained, but no vegetables.

There is no watering place.

Four steamship companies have vessels calling monthly.

Tumbo point is the southwestern extremity of Tumbo island. Southward of Tumbo point the land recedes to the northeastward about 7 miles, forming an extensive but shallow bay, at the head of which is an inconsiderable stream named Tanneneh river, accessible to canoes only.

A ledge of rocks extends ½ mile SW. from Tumbo point, terminating in two rocks which uncover at half tide.

Remarks.—When approaching the coast in the vicinity of isles de Los, it may be remarked that though a bank of 3 fathoms in some places extends to a considerable distance from the shore, yet the soundings are so regular as to give ample warning. A tumbling sea at times may prevail during a strong breeze, but as no gales (except tornadoes, which are of short duration and blow off shore), are experienced upon this coast, the mariner need never be alarmed, for there is generally good anchorage everywhere, and no long swell or current to force a vessel into danger.

Manea river, about 12 miles east of Tumbo point, is at low water scarcely accessible to the smallest coasting vessels. The entrance is about 6 miles southeastward from that of Tanneneh river, but the water between is very shallow; a mud bank, which extends southwestward from the west point of the entrance of Manea river, is uncovered at low water, for a distance of about 2 miles from that point. A similar mud bank fronts the east side of the entrance also, leaving the channel between, about a mile wide, but carrying only from 3 to 8 feet at low water.

Directions.—To enter Manea river it is only necessary to bring the western point of the entrance (while at the distance of 5 miles from it) to bear N. 42° E. (N. 62° E. mag.), and then steer toward it, until close to the northern mud bank at the entrance, when a vessel may proceed along the edge of that bank, in a convenient depth, according to circumstances. The quantity of water discharged from this river must be very great, as the ebb tide runs out with great rapidity.

Morebaia river lies about 18 miles S. 82° E. (S. 62° E. mag.) of the isles de Los, and about 7 miles north from Matakong island; and though its breadth within the entrance points nowhere exceeds ½ mile, yet it is far more accessible than the Manea. The entrance is narrow, and the channel across the bar forms an elbow, which, to render perfectly safe of approach, would require to be marked by two buoys, as the coast is destitute of good natural objects to serve as leading marks; the following directions however may be of use. The least water on the bar is 1¼ fathoms.

Directions.—In approaching the coast in the vicinity of Morebaia river, when its opening bears N. 53° E. (N. 73° E. mag.), distant about 9 miles, and Matakong island bears S. 79° E. (S. 59° E. mag.), there will be 6 fathoms water on black mud; from this position, keeping on a N. 53° E. (N. 73° E. mag.) course, the depth will decrease gradually, over a bottom of the same kind, to 3½ fathoms at the entrance of the channel. With the rounding of the land between the rivers Manea and Morebaia bearing N. 3° E. (N. 23° E. mag.), the SE. point of the entrance N. 62° E. (N. 82° E. mag.), and the center of Matakong island S. 51° E. (S. 31° E. mag.), the depth is 3½ fathoms. From this position steer N. 39° E. (N. 59° E. mag.), until the east entrance point of the river bears N. 73° E. (S. 87° E. mag.), and then stand in toward this point, remembering that both flood and ebb streams set partially over the extensive shoals that form the south side of the channel; some of these, however, being dry at low water, and others nearly so at high water, their steep boundary is perfectly discernible. In the elbow of the channel across the bar, the least depth is 1¼ fathoms at low water springs, but this depth continues only a short distance; and from the time of altering course to the eastward, or steering directly in, there will seldom be so little as 2 fathoms. Beyond the eastern point, the depth varies from 4 to 6 or 7 fathoms, and for the distance of 7 miles up the river, it appeared to be clear of all danger.

Granite rock.—At about 3 miles within the east entrance point of the river a remarkable round mass of granite rock rises abruptly, to a height of about 40 feet. It is about 400 yards in circumference, and situated near the shore on the eastern side; the natives assert that several similar masses are scattered about the plain as far as the Sangari mountains, which, they report, are also composed of the same species of rock.

Tides.—It is high water, full and change, in Manea and Morebaia rivers at 7h. 40m.; springs rise 11 feet.

Aspect of coast.—The contrast which the coast in this vicinity presents to the eye in different states of the atmosphere is very great. In clear weather the view of the fertile shelving hills in the isles de Los—the stupendous features of the distant inland mountains—the plains covered with trees, and the beautiful little island of Matakong, is highly interesting; while in hazy weather, nothing is visible but a low coast, fringed by

mangroves, and enveloped in mist, with an indistinct opening of a river here and there, or perhaps a column of smoke rising from a native village.

Matakong island is 22 miles southward of the isles de Los; its beauty consists in the luxuriance of the trees, the verdure of those spots which have been cleared, and its gentle slopes, which render it a striking contrast to the low swampy tract of mainland opposite. It is about a mile long, and ¾ mile broad, and is the central depot for the trade in groundnuts carried on with the neighboring coast, a factory being built on the north side. There are also barracks and a customhouse. The island appears to be composed of lava, yet on its summit there are two large pieces of granite, which the natives assert have been artificially placed there.

At the factory there is a crane to assist in loading and unloading boats and small vessels. In 1879 the wharf could be used only at high water.

Matakong island is surrounded by mud banks and rocks in all directions, so that none but small vessels can lie at anchor within 2 miles of it. The channel which divides it from the mainland is nearly ¾ mile broad, but dries at low water.

Soundings.—In the extensive bay between Matakong island and the isles de Los, there are no detached dangers. The coast is safe to approach, the soundings being regular and anchorage good. It is in all parts accessible to large vessels to the distance of 7 miles from the shore, which generally may be considered sufficiently near to distinguish the land, and often to recognize the mouths of the rivers. In thick weather the water should not be shoaled under 7 fathoms.

Coast.—Sallatuk point bears S. 25° E. (S. 5° E. mag.), distant 14 miles from Matakong island; the general features of the coast between are similar to those already described, but the inland mountains are too distant to be distinctly seen. Here and there a cotton tree with smooth trunk and spreading foliage, rises above the surrounding thickets, and serves to identfy the locality to those who are acquainted with it; but a stranger can only distinguish the mouths of the rivers which he intends to enter by the latitude, or by running along the coast from some known point.

Forikaria river.—From Matakong island the coast trends to the eastward for 3 miles, where it turns abruptly to the northward and forms the west entrance point of the Forikaria river, the space between being fronted with sand and mud banks, which extend more than 3 miles to the southward. The entrance of this river is about 2 miles wide, and the least depth in it is 6 feet.

To enter.—To sail in, it will be necessary to pass close to the banks which extend from the west entrance point, but at the same time to be cautious in approaching them, as they are steep-to and dry at low water. The outer sand will be apparent, even in fine weather, except perhaps at high water, and when seen may be safely skirted in 2 fathoms near low

water, or in 1 fathoms at high water. In order not to get entangled in the bight between the forks of this sand, do not bring the highest part of Matakong island to bear westward of N. 37° W. (N. 17° W. mag.) until the west entrance point of the river bears N. 25° E. (N. 45° E. mag.). Then steer toward the west point, and as a general rule keep near the western side of the river, though edging off occasionally to avoid the banks. The navigable part of the river is very short, as a ridge of rocks nearly crosses it at a mile from its mouth. The ebb stream here is extremely rapid, and the overfalls in the vicinity of the rocks are dangerous to those who do not possess local knowledge.

Tanna island divides the entrance of Mellakori river from that of the Forikaria. The west and SW. sides of this island are fronted by extensive sand and mud flats, which dry in several places at low water.

Mellakori river.—This river flows into the sea immediately northward of the high land of Sallatuk point, distant 34 miles N. 3° W. (N. 17° E. mag.) of cape Sierra Leone. It has better natural objects for leading marks than either of those rivers already described; but though the facilities for its navigation are greater, yet a pilot is indispensably requisite.

Three important streams flow into Mellakori river. On the northern side Tanna river, immediately east of Tanna island, affords communication with the Forikaria, and on the southern side Sambo river, entered 3 miles east of Benti point, communicates with Skarcies river. Morikaria river, the entrance to which is on the south side, 2 miles east of that of the Sambo, has not yet been explored.

Shoal.—A shoal of 15 feet has been found in the south channel to Mellakori river. The shoal has a length of about 600 yards, in the direction NE. and SW., and a width of 200 yards, with depths of 15 to 16 feet.

To approach.—At 10 miles off shore when west of the entrance there are 6 fathoms water, and with the river's mouth bearing N. 59° E. (N. 79° E. mag.), it will be fairly open. Steer toward the south channel in that direction until the soundings have decreased gradually to about 3 fathoms at low water, and the following bearings are obtained: Bellansang point, on which there is a conspicuous clump of trees, N. 73° E. (S. 87° E. mag.); west extreme of Yellaboi island, S. 29° E. (S. 9° E. mag.); Sallatuk point, distinguishable by the trees upon it being higher than elsewhere, S. 59° E. (S. 39° E. mag.); the north entrance, or Tanna point, N. 50° E. (N. 70° E. mag.); and the rounding of the land to the northward of the river N. 20° E. (N. 40° E. mag.). This position is near the spot indicated by the outer anchor in the plan and in the fairway.

Middle ground, a bank of hard sand that forms the north side of the south channel, is steep-to, but the edge of the bank is generally marked by strong ripplings; the pilots recommend skirting it, instead of borrowing on the other shore.

The eastern extremity of Middle ground dries at low water, also some places on its northern side. Middle ground divides north from south channel.

Pilots.—Good pilots for Mellakori river may be obtained at Sierra Leone for either a steamer or a sailing vessel.

To enter.—A vessel of 15 feet draft may enter at three-quarter flood, when the least water found will be 19 or 20 feet, hard sand; bring Benti point to bear N. 59° E. (N. 79° E. mag.), and keep it on that bearing until about a mile from Tanna point, when haul over toward the mouth of Tanna river, and there anchor.

Beacons.—The outer edge of the shoals on either side of the river between Tanna river and Benti point is marked by a red beacon surmounted by a conical ball; at low water these beacons are dry, and at high water the balls are awash. They are not to be depended upon.

Rock.—A rock with 7¾ feet on it lies N. 54° W. (N. 34° W. mag.) of the south beacon, distant 270 yards.

To proceed above Tanna river.—The deep water channel between the banks extending from the north and south shores is ⅛ mile in breadth, with a depth of 7 to 9 fathoms. By keeping the east point of Tanna river bearing N. 79° W. (N. 59° W. mag.), this channel may be used with safety; the northern beacon, in line with the northern cottonwood tree on Benti point, leads north of the southern bank, and by keeping the same beacon in line with the trading post at Benti, a vessel may proceed until within 400 yards of the beacon, which should be rounded at a distance of 100 yards; after passing this, the south bank of the river may be followed as it is safe of approach, and, except a few rocks close to Benti point, a vessel may ascend the river to the factories established abreast of Devil island, 2½ miles east of Benti point, the general depth in the channel varying from 4 to 9 fathoms. In front of the wharf at Benti there is an eddy current, which must be guarded against. Vessels trade as far up as Malaguia, but those of 10 feet draft are advised to anchor off Toumani, 6½ miles above Benti point.

Shoals.—French chart 3008 (ed. of 1889) shows a 10-foot spot, marked P. D., as lying nearly ½ mile westward of Benti point, and another spot in mid-channel with from 6 to 12 feet, just in the bend of the river beyond the English factory, about 2½ miles eastward of Devil island.

Benti point is well marked by a tall tree near the extremity; since 1866 it has been occupied by the French as a fortified post.

North channel.—Besides the channel on the south side of Middle ground, for which directions have been given, there is also an entrance to the northward, only available for small vessels; to take which, when 5 or 6 miles off shore, bring Tanna point to bear N. 78° E. (S. 82° E. mag.), and by carefully using the lead, a handy vessel may proceed in with safety; for

although at its termination the channel takes a slight turn round the NE. edge of Middle ground, yet this is generally so well indicated that one can scarcely be deceived. The north bank at the entrance of the river is said to be extending.

Tanna river.—This river, which flows into the Mellakori on the northern side, is also navigable, though much smaller, and the tides are not so strong as in the main stream. At 5 miles from the entrance on the west side is a creek that admits of boat communication with Forikaria river.

A bank which dries at low water extends for over ½ mile in a westerly direction from the east point at the entrance to Tanna river. Opposite the south point of this bank, and about 160 yards from the right bank of the river, is an insolated rock which dries about 6 feet at low water springs.

Sallatuk point is higher than any part of the adjacent coast. It is covered with mangrove bushes, which give it the appearance of terminating abruptly; a reef of rocks, both above and below water, extend 1¼ miles NW. and north from Sallatuk point.

Caution.—On account of the soft nature of the bottom, vessels may ground in several places in the vicinity of Mellakori river without being injured; but the foul ground which surrounds the long reef off Sallatuk point must be carefully avoided.

Tides.—It is high water, full and change, in Mellakori river at 7h. 40m.; springs rise 11 feet.

Coast.—From Sallatuk point the coast trends SE. for a distance of 7 miles to a small river, on the western point of which is Sangatuk factory; at about 1½ miles westward of this point lies Yellaboi island, surrounded by mud banks that are dry at low water, and which then connect it with the mainland. Another small river named Inglis Pahboyea empties 1½ miles southward of Sangatuk factory.

Yellaboi island is low, swampy, nearly 2 miles in length, and covered with trees, which toward its western extremity give it the appearance of an abrupt cliff, easy to be recognized.

Kortimo island lies 4 miles SE. of Yellaboi island; it is a much larger island, with extensive mud banks extending to the northwestward, but with a deep channel between it and the mainland; it lies in the entrance of the Skarcies rivers. These streams are known by the names of Great and Little Skarcies; the latter river is adapted to very small vessels only, and requires careful pilotage.

Great Skarcies river is navigable for large vessels. Kakonka island lies in the mouth of the Great Skarcies; a reef runs off its eastern end. Since the customhouse has been established the island has been partly cleared of mangrove bushes. Vessels can not clear here either in or out, but have to do so at Sierra Leone. No supplies can be had. The French have a factory at Mambolo, 10 miles above Kakonka island. The direct

channel from seaward to Great Skarcies river leads across 7 miles of shoal water, and shifting banks; and, therefore, vessels would do well to adopt the entrance through Yellaboi sound; for although the banks in this sound are steep, yet it is broad and deep, and a large vessel, by taking a proper time of the tide, might cross the bank which obstructs the eastern part of the sound, and moor off the south extreme of Yellaboi island. Mambolo can be reached by vessels drawing 15 feet. Less than 10 feet can be carried about 8 miles further up.

Yellaboi anchorage.—To sail into this anchorage, bring the west extreme of Yellaboi island to bear N. 48° E. (N. 68° E. mag.), and steer toward it until the depth decreases suddenly to 5 fathoms. Now alter course, and keeping in from 3½ to 5 fathoms, steer for Inglis Pahboyea river well open of the SE. extreme of Yellaboi island, bearing N. 65° E. (N. 85° E. mag.), until the west extreme of that island bears north (N. 20° E. mag.); then haul in toward the island, and skirting along the steep mud bank which borders its south side, steer for its SE. extremity, close to which a vessel may anchor in 3½ fathoms. By following these directions, the least depth found will be 1½ fathoms at low water, and this occurs after hauling in for the island.

Strangers going up the river should procure a pilot at Sierre Leone. The chief difficulty is the passage on the south side of Yellaboi island, where there is a bar which is continually shifting, and also a bank off the entrance of Inglis Pahboyea river, where several ships have grounded.

Kakonka island.—A timber vessel lying at Yellaboi anchorage could easily have the cargo rafted down from Skarcies rivers, except during the rainy season, when it is affirmed that the strong winds occasion so heavy a sea as to make it unsafe to lie there with raft ports open. With little difficulty, however, at that season, a vessel might proceed to Kakonka island, though the channel is narrow and crooked, and would perhaps require buoying. It would be scarcely possible to give intelligible marks for this winding channel, but by sending a boat ahead a vessel can scarcely make any mistake; the bottom is so soft and the water so smooth that no damage will arise from touching.

In June, 1876, the bar south of Yellaboi island (on which was a depth of about 9 feet at low water) was found to lie to the westward of its assigned position, and there was a depth of 3½ fathoms on the flat extending from the south coast of that island. Between Sangatuk factory and Inglis Pahboyea river, a mud bank, dry at low water, extends a considerable distance to the southward.

Tides.—It is high water, full and change, in Great Skarcies river at 7h. 10m.; springs rise 10 feet.

Coast.—From the point forming the south side of the entrance to the Skarcies rivers the coast trends southwesterly to Ballo point, and thence to the

mouth of Sierra Leone river, from which it is distant 18 miles, it takes a more southerly direction. This coast is fronted by an extensive shoal, the depth of one fathom being found in some places at a distance of 4 miles from the land; and with Ballo point bearing about N. 70° E. (east mag.), a vessel will not be sure of carrying 7 fathoms at a less distance off shore than 14 miles.

Cooper rock, which generally breaks, is on the southern part of this bank. From it cape Sierra Leone bears S. 14° W. (S. 34° W. mag.), distant 6 miles; this rock lies 2¾ miles from the nearest shore.

Soundings.—Between isles de Los and Sierra Leone, although the shoals extend some distance from the land, no danger need be apprehended if the soundings are strictly watched and a 7-fathom line maintained. The mud in the channels is soft, and, with the sand, apt to choke the pipes in the condensers of steamers.

Sierra Leone, in respect of the number of its European residents, is the most considerable of the British possessions on the west coast of Africa. The colony consists of the peninsula that terminates in cape Sierra Leone, with a large tract of country named Sherbro.

Sierra Leone river is navigable for boats as far as Rokel, between which place and Rokon there are rapids, and navigation is dangerous. Steamers do not ascend beyond Benkia.

Buoy.—A red buoy marking the telegraph cable lies with King Toms point bearing S. 48° W. (S. 68° W.) distant 200 yards.

Entrance.—The entrance to Sierra Leone river, immediately northward of cape Sierra Leone, is obstructed by an extensive bank of sand interspersed with large stones, named the Middle ground, which in many parts is dry at low water. There is a passage on either side of it, but that to the northward is only available for small vessels, and even by them is rarely attempted, as they must cross a 2-fathom bar, which appears to connect the eastern extremity of Middle ground with the mainland. The principal channel lies between cape Sierra Leone and that bank, having a clear passage of more than a mile in breadth everywhere, with a depth varying from 5 to 10 and 12 fathoms. The bank is reported as extending on the southwestern side.

Carpenter rock lies S. 77° W. (N. 83° W. mag.), distant ¾ mile from the lighthouse on cape Sierra Leone; it uncovers at half tide, and may easily be distinguished by its breakers. It should be borne in mind that both flood and ebb streams set directly on this rock.

Clearing marks.—Any point from Farran point to Lookout point, kept open to the northward of cape Sierra Leone, leads north of Carpenter rock; this mark is also useful in observing the direction of the tidal stream. During the ebb the stream sets to the southeastward, and to the northward during the flood.

Bromham rock lies between Carpenter rock and the shore, and appears to be the termination of a series of shoals that extend in a westerly direction from the extreme west point of the cape. The rock is about 30 yards in circumference, nearly flat, and has only 16 feet on it at low water springs. There are 4 and 5 fathoms between it and the shore, and 5 and 6 fathoms close to and around it. From the rock Sierra Leone lighthouse bears N. 42° E. (N. 62° E. mag.), distant 800 yards; and the extreme west point of the cape N. 62° E. (N. 82° E. mag.), distant 250 yards. The lighthouse bearing S. 87° W. (N. 73° W. mag.) leads north of the rock; and the north extreme of the sandy beach, where it first joins the rocks south of cape Sierra Leone, bearing N. 64° E. (N. 84° E. mag.), will lead southward of it.

The channel between Carpenter and Bromham rocks is clear, but is not recommended except in cases of emergency. Even in the dry season the tide rip in this channel is dangerous for boats.

Coast.—Between cape Sierra Leone and Freetown the coast is indented by three bays, the western of which is known as Pirate bay, and the eastern Kru bay; between these is English bay.

Pirate bay.—The western entrance point of Pirate bay is surmounted by a peak, which rises higher than cape Sierra Leone, and on a hill about a mile south of the east entrance point (Lookout point) there is a lookout station.

The shore of Pirate bay is of reddish and dark rocks.

King Toms point, which forms the dividing point between English and Kru bays, is the northern extremity of a flat, almost circular peninsula, which on some parts is thickly wooded; there is a battery and some ruins at its north extreme, and a large mission establishment on its eastern side.

Freetown.—The capital of Sierra Leone and the seat of government was founded in 1792; it is built on rising ground sloping from the hill on which stands fort Thornton. On an elevated plateau 400 feet high, lying south of this hill, are the hospital and barracks. The population in 1881 was 22,000.

Sierra Leone.—The streets of Sierra Leone are wide but unpaved, the houses being mostly constructed in European style; it is the residence of the principal civil and military authorities connected with the West Africa settlements.

The United States is represented by a consul and vice consul.

Lights.—On the northern extremity of cape Sierra Leone is a lighthouse. 69 feet high, from which two lights are exhibited, visible in clear weather from a distance of 13 and 14 miles. The upper light is fixed and flashing every 30 seconds. The lower light is fixed red.

A small fixed green light is shown from the government wharf as a guide to the anchorage.

Telegraph.—Sierra Leone is in telegraphic communication with Bathurst, isles de Los, Konakri, Accra, and England.

Diseases.—African fever is the principal disease; there is a little dysentery or diarrhœa. The usual precautions of keeping out of the sun and to avoid chills are necessary. Flannel should be worn.

Supplies.—There is a naval depot at Freetown, from which provisions and water can be obtained.

Coal.—About 6,000 tons are usually kept in stock; it can be put on board at the rate of 150 tons per day from lighters. There is a government jetty at which goods are landed. There are no facilities for repairing vessels.

Port dues.—From and after November 9, 1883, any vessel can enter the harbor of Sierra Leone for the purpose of taking coal or provisions, discharging or receiving crew or passengers with their baggage, receiving or delivering mails, or repairing damages, without having to pay any tonnage, harbor, or light dues; but the master of the vessel must, inside of 18 hours, notify the collector of customs of the specific purpose of his call.

No vessel so entering must break bulk or take cargo of any kind, subject to a heavy penalty; but if the discharge of cargo is necessary for the repairs of damages, the fines and penalties consequent may be remitted.

A customs officer will be put on board the vessel during her stay, for which a charge of $1.25 per day (the day beginning and ending with midnight) shall be made.

The harbor limits for this purpose shall be, on the west a line running due north from the sand beach on King Toms point; on the east a line running due north from Cars point and reefs near Destruction bay, the space between said lines being bounded on the north by the Middle ground. Pilotage is not obligatory for vessels which enter at Sierra Leone.

Approaching the land.—Vessels approaching from seaward will probably endeavor to strike soundings in latitude 8° 30′ N. When in a depth of 9 or 10 fathoms they will be 12 or 13 miles from the shore; or if the weather be clear, they will have seen the high land named Lion mountains, south of the cape, which should be brought to bear S. 88° E. (S. 68° E. mag.); when about 10 or 15 miles distant from the shore, cape Sierra Leone will be seen, making like a low point, with a ridge of cocoanut trees close to the water's edge, and shortly after the lighthouse on it will be distinguished. In winter the land is often covered in mist, rendering objects undistinguishable, and frequent soundings should be taken.

Directions.—Allowance for the tide must be made when nearing Carpenter rock. The cape may be passed at a distance of ¼ mile, with a commanding breeze, in 9 or 10 fathoms. From thence a S. 82° E. (S. 62° E. mag.) course for 3 miles will lead to the anchorage off Freetown; it is recommended to keep somewhat near the shore, where the tides are less strong, thus avoiding the Middle ground and the numerous eddies round

it, which are so strong as to effect the steerage. A vessel of 24 feet draft should not bring Sierra Leone lighthouse to bear southward of S. 31° E. (S. 11° E. mag.) until Farran point bears S. 76° E. (S. 56° E. mag.) in order to clear the Middle ground.

Anchorage.—To anchor a large vessel off Freetown, bring fort Thornton to bear about S. 9° E. (S. 11° W. mag.), and King Toms point S. 81° W. (N. 79° W. mag.), which position will be 400 yards from the shore, in 17 fathoms, muddy bottom, and where a vessel may moor with open hawse to the northward. Small vessels generally anchor within the line of Farran and Lookout points, where very little tidal stream is experienced.

Approaching by night.—When approaching Sierra Leone by night from the northward, the light should not be brought to bear west of south (S. 20° W. mag.) to avoid the Middle ground; and if from the southward and westward, keep the light bearing southward of N. 87° E. (S. 73° E. mag.) to avoid Carpenter rock. After passing the cape, the green light at the extremity of the government wharf will guide to the anchorage; but should the light on the cape not be seen, vessels are advised to anchor, in order to make sure of their position, as the tide and current sometimes combine in sweeping them out of sight of the land before morning, or even into the dangerous vicinity of St. Ann shoals.

Turning marks.—When working in or out of Sierra Leone river (which must never be attempted unless with a favorable tide), stand no nearer the Middle ground than 7 fathoms, nor with an ebb tide to within ¾ mile of Carpenter rock. King Toms point, in line with the center Barrack, bearing S. 51° E. (S. 31° E. mag.) easterly, leads clear of the west extreme of the Middle ground.

Leaving Sierra Leone.—When proceeding to the northward, the light on the cape bearing S. 8° W. (S. 28° W. mag.), leads west of the Middle ground in 4 fathoms, but before altering course for the northward, the light should be brought to bear S. 31° E. (S. 11° E. mag.), or more easterly if the flood stream should be making.

Tides.—It is high water, full and change, in Sierra Leone river at 7h. 5[illegible]; springs rise 12½ feet. In the rainy season the ebb stream runs with great strength, sometimes at the rate of 6 knots an hour; but in the dry season the velocity of neither tidal stream exceeds 2½ knots an hour.

Pilots.—Vessels intending to proceed up the river beyond Freetown, must take a pilot on board, as the channel is narrow and dangerous by steering S. 88° E. (S. 68° E. mag.) for 3 miles from the [illegible] mag.), yet, beyond that distance, the navigation becomes intricate. The pilot-boat carries a flag [illegible] by day and a light at night.

Orontes bank [illegible] S. 50° W. (S. [illegible] W. mag.) from Sierra Leone light-house. The bank apparently extends [illegible] and is [illegible]

False cape.—Southward from cape Sierra Leone for a distance of 4 miles, the coast forms a slightly indented bay, bordered with trees, and terminating in a double rocky point, named False cape, which bears almost south (S. 20° W. mag.) of cape Sierra Leone. From thence to cape Shilling the coast trends SSE. for a distance of 18 miles; there is a small village at the entrance of York river at 6 miles north of cape Shilling.

Cape Shilling is low and covered with trees; from a distance of 10 or 15 miles it appears like a small island. At this cape the mountains of Sierra Leone terminate, after forming a high double range, which is visible from a great distance. The southern extremity of the range is the most elevated, and though its summit is generally enveloped in clouds, it is often seen from a distance of 40 or 45 miles. Kent town, stands on the side of a hill near the cape.

Banana islands, lying 2 miles SW. of cape Shilling, very much resemble the isles de Los, but the adjacent land is more elevated. They are extremely fertile with plenty of water, though there are no running streams; considering their proximity to the African continent, they are comparatively healthy, so much so, that the European residents of Sierra Leone frequently resort there to benefit their health. The islands are three in number, lying in a NE. and SW. direction. The largest, which is the northeasternmost, is not lofty. The middle island is volcanic, about 900 feet high and covered with wood; it is separated from the NE. island by a narrow unnavigable strait (filled up by the natives in 1877), and from the SW. island by a passage about 70 yards wide, in the center of which there is not less than 18 feet. The SW. island is about 70 feet high and rather more than a mile in circumference; being open to the sea breeze, it is considered the most healthy of the group. A copious and permanent spring of fresh water is said to exist at its southeastern extremity. A rock which uncovers at half tide lies S. 48° W. (S. 68° W. mag.) of the southwestern extremity of this island, distant ½ mile, with foul ground between; sailing vessels without a commanding breeze should not approach this rock within ½ mile.

The channel between Banana islands and cape Shilling is obstructed by two rocks. A wreck occurred on a rock with 8 feet water on it is about 400 yards N. 8° E. (N. 28° E. mag.) of the small islet close to the NE. shore of Banana island and about the same distance from the island.

Tides.—It is high water, full and change, at Banana island at 8h. 15m.; springs rise 9 feet.

Anchorage.—Vessels may anchor off any part of the coast between cape Sierra Leone and the Banana islands. During the tornado season, from a berth on the NW. side of the group with the extremes bearing S. 43° E. (S. 23° E. mag.), and S. 36° W. (S. 56° W. mag.), if a vessel parted she would drift clear of danger.

Yawri bay.—Tasso point lies 18 miles SE. of cape Shilling, and west from it extends the Plantain islands and Bengal rocks, forming the northern side of the entrance to Sherbro river. The space included between Banana and Plantain islands is named Yawri bay, into which the Oribi, Kamaranka, Bompeh, and Cockboro rivers flow. The shores of this bay are unapproachable, being fronted by a reef extending 4 miles from the coast, many parts of which are dry at low water.

Oribi river is navigable for boats as far as Mafengbeh, about 22 miles from the entrance, and for steam launches drawing 4 feet of water to within 200 yards of that place. The entrance is much obstructed by sand banks, some of which uncover at low water. Inside the bar the river widens and is deep; just above where the steamers anchor there are some rocks nearly in mid-channel.

Bompeh river forms the best route to the Mendi country. Small steamers can go up to the fork of the Rotifonk and Senahu rivers.

Tasso point, on which there is a native village, is somewhat high on its northern side, sloping to a sandy beach on the south.

Plantain islands are low and wooded, nearly connected with Tasso point by a chain of rocks above and below water.

Bengal rocks consist of two groups, the western, above water and of a black color, are S. 81° W. (N. 79° W. mag.) of Tasso point, distant 5 miles.

A dangerous shoal, on which there is a depth of 9 feet, lies N. 88° W. (N. 68° W. mag.) of the western Bengal rock, distant 1½ miles. At one mile N. 20° W. (north mag.) and one mile S. 38° E. (S. 18° E. mag.) of this shoal are 6-foot patches.

Sherbro river.—Sherbro river is bounded on the north side by the mainland and on the south by Sherbro island. Though locally known as Sherbro river, it is more correctly described as a sound or strait. The width of entrance to this river is 21 miles, from Tasso point on the north to cape St. Ann on the south. This width decreases rapidly on advancing eastward, and abreast of the village of Jenkins it is only 3 miles wide. Four rivers flow into the Sherbro river from the north and east—the Yaltukka, at 11½ miles SE. of Tasso point; Bagru river, 16 miles further east; the Jong, 11 miles more to the SE., and Bum-Kittam river, 8 miles beyond to the southward. This last has its outlet close north of Manna point, the eastern limit of Shebar entrance.

Coast.—The coast between Tasso point and Buoy point on the north side of Sherbro river, is low and sandy, fronted by an extensive shoal bank extending in some places 5 miles from the coast; between Yaltukka river and Buoy point the shore is thickly wooded.

Buoy point, 8 miles from the entrance to Yaltukka river, is clearly defined, and though low, is visible for some distance; Mendo tree, situated about 4½ miles NW. of Buoy point, and ½ mile from the coast, is high and

round, being conspicuous for a distance of 7 or 8 miles. From Buoy point the villages of Jenkins and Jamaica on the south shore are visible; the former may be recognized by two large trees.

Sherbro island.—The northern coast of Sherbro island is fronted by extensive shoals, the western portion of which, known as Turtle and Sherbro banks, extends for a distance of 16 miles in a nortwesterly direction from cape St. Ann, and restrict the width of the navigable channel at the west entrance of Sherbro river to 4 miles.

On the north coast of Sherbro island there are several clumps of trees, and two villages known as Jenkins and Jamaica.

Jamaica point, having on it several tall straight trees, is bold and dark looking. Sherbro island is very unhealthy for Europeans.

Middle ground.—At Buoy point the main channel of Sherbro river is divided into two by a shoal of irregular form about 7 miles long, known as the Middle ground, the northern part of which dries at low water; upon this bank there are several other places which also dry at low water.

Bagru channel lies north of Middle ground; it is available at all times for vessels drawing 24 feet; the bottom is of soft mud.

Jenkins channel, which lies south of Middle ground, is intricate, and only available for small vessels, the eastern part being obstructed by a shoal, which lies between Jamaica village and the east extreme of Middle ground; the bottom in Jenkins channel is of hard sand.

Channel.—Between the east extreme of Middle ground and York island the channel is narrowed by Bobs island, Rendall island, and Long island, all on the eastern side.

Bobs Island flat is an extensive shoal, extending from the north extreme of Bobs island, and connecting it with the north extreme of Rendall island; the south extreme of Bobs island and the west extreme of Long island are well defined and steep-to.

When nearing Long island, the wharf and European houses on York island become visible.

After rounding York island, the village of Bendu on the eastern shore comes in sight, and then Bonthe and Victoria on the western side, at each of which there are several European houses.

Bonthe is the residence of the government officials.

Between York island and Bendu great attention must be paid to the steering of a vessel; vessels of 300 tons ascend Sherbro river as far as Bendu.

NOTE.—The buoys which formerly marked the several positions of the shoals in Sherbro river have all disappeared (1880).

Directions.—From the great uncertainty of the buoys being in position, it might be only misleading to give any detailed directions for navigating the rivers; a pilot should be taken. If a pilot can not be obtained, a good

lookout and careful attention to the lead, with the assistance of the track laid down on the Admiralty chart, No. 617, will be the best guide.

A shoal of 10 feet, lying 1,600 yards south of Buoy point at the western entrance to this channel, should be passed to the southward, and a course of S. 79° E. (S. 59° E. mag.) for a distance of 6¼ miles leads from thence to the eastern extreme of Middle ground.

From this the channel lies midway between the southern shore and the western edge of Bobs Island flat, until within a mile of Jamaica point, when a narrow channel south of Bobs island is entered, in which there is only a depth of 19 feet at low water.

Between Bobs island south extreme and Long island, bring Jamaica village a little open south of Bobs island, and with this mark astern run to the western extreme of Long island, keeping along its southern shore; a black buoy should mark the southern edge of a flat which must now be crossed; there is only 15 feet at low-water springs over this flat.

Having passed close to the eastward of this black buoy, continue on in mid-channel towards Macauley island, passing midway between it and the flats which partly dry and extend from the eastern shore of the river. Next steer for Hutchinson island, and then close along its northern shore for York island, off which there is anchorage in 24 feet, mud.

Vessels drawing 15 feet may proceed from York island to Bendu, on the eastern shore of the channel landing to Shebar entrance with little risk, but the channel requires buoying; and great attention must be paid to the steering of a vessel.

From Bendu to Victoria, on the western shore, the channel can not be used without the assistance of buoys, as it is very narrow, the greatest depth in it being only 14 feet at low water, and the tides running strongly.

Off Victoria there is a depth of 5 and 6 fathoms close to the shore. Good wharves could be easily and cheaply built for loading small vessels.

In navigating Sherbro river, due allowance must be made for the tidal stream, which runs with an average velocity of 2 knots an hour.

Greatest draft.—It is the opinion of experienced local pilots that no vessel drawing more than 18 feet water can safely ascend the river.

Bagru river forms a junction with Sherbro river north of Bobs Island flat. It takes a straight course for 5½ miles in a NE. direction, when it is joined by Raleigh river, above which junction its winding course has been traced for about 10 miles to the native town of Tasso. Edmonstone island, with a bank extending from its NE. and west sides, is at the mouth of Bagru river, 1½ miles eastward of Falcon point, its northern entrance point.

The depth of Bagru river, between its mouth and the junction with Raleigh river, varies from 3 to 5 fathoms. It is navigable for steamers as far as Tasso.

Bum-Kittam river is entered immediately north of Manna point, the east entrance point of Shebar entrance; in the dry season it is only navigable for vessels drawing 4 or 5 feet. In the wet season this river rises above 12 feet at the lower part and as much as 25 feet at the upper part.

Shebar entrance.—Sherbro river can be entered from the southward by a channel at the SE. extreme of Sherbro island, known as Shebar entrance. The entrance points, named West Sand head and Manna point, have long sand spits extending from them, on which the sea breaks at all times of tide. Between these sand spits is the bar.

From Victoria to Shebar entrance the navigation of the channel is simple, but there is only 14 feet over the flats off Bum-Kittam river. Having passed these the water quickly deepens to 6, 8, and 10 fathoms.

The dangerous state of the bar at the time of the Admiralty survey in 1870 prevented its being sounded, but the local pilots report that there is as much as 18 feet on it at high water. Vessels drawing over 10 feet, however, should not cross it even under favorable circumstance. It is therefore of no use to the mail steam packets.

Caution.—There is reason to believe that the spits of sand at Shebar entrance are not stationary, and, therefore, a vessel obliged to attempt an entrance should send a boat to mark the extreme of one or both of them.

Anchorage.—Vessels of war occasionally anchor off the entrance to Shebar river and communicate by boat.

Tides.—It is high water, full and change, in Sherbro entrance at 6h., springs rise 11 feet; at Bobs island at 7h. 50m., springs rise 6 feet, and neaps 5 feet; and at Bendu flats at 8h. 15m., springs rise 4 feet, and neaps 3½ feet. The tidal streams in Shebar entrance are very strong, running at least 4 knots an hour at half tide during the dry season, so that during the rainy season this channel would probably be impassable.

The flood stream makes in Shebar entrance at 2 hours before it is low water at Bobs island, covering the banks near York and Macauley islands. When the tide is rising at Bobs island, the strength of the stream turns the tide coming from the Shebar entrance, which then passes between the islands and up Bum-Kittam river. The ebb also makes through Shebar entrance at 2 hours before it is high water off Bobs island, which latter place may be considered as the point where the tides meet.

Winds and weather.—On that portion of the coast between cape Verde and Sierra Leone the prevailing winds during the rainy season (June to September) are from the southward and westward, with squalls from SW.; these prevailing winds are usually light.

During the fine season southerly and westerly winds are also occasionally experienced veering to NW. in the afternoon.

Near the land (except during the winter season) land and sea breezes prevail with great regularity.

Harmattan.—The harmattan season commences with December, or rather earlier than off the Gambia, and extends through December, January, and February; occasional intervals of clear weather, accompanied by a refreshing sea breeze from the NW., afford a respite to the oppressive effects of this wind. Nor does the harmattan blow uniformly either in the same direction or with the same strength; for it ranges through eight points of the compass from NE. to SE., and however fiery at the commencement, declines after the first month to a comparatively light breeze.

Tornadoes.—The tornadoes precede the rains sometimes by as long as a month, and again return after the rains have ceased. They blow from east to SE., and toward the end of the tornado season occasionally from the southward, with great fury, but seldom lasts more than three hours. They are generally preceded by the appearance of a light arch in the east, with dark clouds and occasional flashes of lightning. A dense white cloud in the center of the arch fortells a powerful blast. The instant those appearances are perceived all square sails should be furled, and the vessel put before wind, for which there is often barely sufficient time.

Rollers.—The surf on this coast is always extremely heavy, and the rollers sometimes curl in 5 fathoms and break tremendously in 3 or even in 4 fathoms. They may generally be expected at the latter part of the rainy season, and chiefly about the time of new moon; therefore, during this season, vessels should avoid anchoring in shallow water in unsheltered places, especially in the vicinity of a large river, as the ebb tide tends greatly to increase the danger.

CHAPTER VI.

SHOALS OF ST. ANN TO CAPE PALMAS.

Liberia, or Grain Coast.

Liberia.—The coast line of the Republic of Liberia commences at the left bank of Manna river.

Liberia was first colonized in 1822, and acknowledged as an independent republic in 1847. The population is over 1,000,000.

Shoals of St. Ann.—The shoals of St. Ann commence near cape St. Ann, the western extremity of Sherbro island, and extend from it 45 miles in a northwesterly direction. They are very numerous, and are composed of knolls of fine light-brown sand, apparently deposits from the waters of the various rivers in their vicinity. The outermost or Northwest patches have 15 feet over them at low water spring tides; and from them the peak of Banana island bears N. 67° E. (N. 87° E. mag.), distant respectively 22 and 16 miles. Between these patches and Turtle islands, off cape St. Ann, the ground is more or less covered with others of similar character, which no description can represent so clearly as the chart.

Fish.—Abundance of fish may be caught by anchoring in 10 or 15 fathoms, sand and shell, anywhere on the shoals; but during the rainy season, from June to September, the sea is generally rough.

Tides.—The tides into and from the bays and inlets north of Sherbro island, set across the shoals of St. Ann with velocities varying from ¾ to 1½ miles per hour during the dry season, and it is probable that during the rains the ebb stream may much exceed this.

Directions.—There is a space of 15 miles between the Northwest patches and Turtle islands in which the knolls have not less than 14 feet water over them at low water; but nearer the shore the depths become more irregular, and the shoal spots more numerous and extensive; and as Banana islands are generally obscured by haze during the dry season, so as to leave no leading object visible, it is recommended not to approach any part of the shoals of St. Ann. Vessels, therefore, from Sierra Leone bound to the southward, should give a wide berth to the Northwest patches, and keep in more than 15 fathoms water till they reach the latitude of 7° 40′ N. They may then steer S. 3° W. (S. 23° W. mag.), gradually edging to the southeastward along the outer edge of the shoals in about 20 fathoms, till they reach the meridian of cape St. Ann, from which position, the coast being quite clear, they may proceed along it in any depth or at any distance that may be desired.

Soundings.—On the parallel of St. Ann shoals, and 34 miles westward of them, the depth is 290 fathoms, shoaling gradually to 13 fathoms at a distance of 18 miles, when it increases to 15 fathoms; and that depth will be found at 3 miles from their western edge.

Turtle islands.—These islands at the extremity of cape St. Ann, like the shoals off it, appear to be formed by deposits from the rivers near Sherbro island. They are sand banks, gradually acquiring vegetation, and some already thickly wooded. They stand upon an extensive flat of sandy banks, and have no navigable channels between them.

Many natives are settled upon them, who appear to be well supplied with domestic fowls, fish, and bananas.

North island, the northwestern of the Turtle islands, is 9 miles N. 45° W. (N. 25° W.) of cape St. Ann. The tops of its highest trees are 72 feet above the sea; and the highest upon any of the Turtle islands do not exceed 135 feet.

Cape St. Ann.—This cape is a low, sandy point, forming the western extremity of Sherbro island. The narrow opening between it and Turtle islands is obstructed with sand.

Coast.—From cape St. Ann to the opening named Shebar entrance the distance is 28 miles in a ESE. direction; the coast between is formed by a sandy beach, free from offlying rocks or shoals and steep-to, having 5 fathoms close to the shore, over a bottom of fine sand. The land is thickly wooded, the forest everywhere advancing to within a few yards of the beach. From Shebar entrance the coast continues nearly in a straight line for about 60 miles to the entrance of the Gallinas river, and though low and sandy, it is free from offlying shoals and steep-to.

Wreck.—The wreck of a small steamer lies in 6½ fathoms water 36 miles SE. of Shebar entrance in latitude 7° 11′ N. and longitude 11° 58′ W.

Bank.—Eleven fathoms has been found in the 35-fathom contour with the entrance of the Gallinas river bearing N. 70° E. (east mag.) and distant 17¼ miles.

Gallinas river.—The entrance to this river is difficult to recognize from the offing.

The action of the surf from without, and the currents of the rivers Gallinas and Sulima from within, has had the effect of throwing up a narrow barrier of sand 5 or 6 miles in length, and of thus forming between it and the shore a long narrow lagoon, in which are several low sandy islands, covered with trees. One or two shifting openings in this barrier allow the escape of the river water; and through them are the only channels by which boats can communicate with the lagoon and the shore.

Anchorage.—The soundings from the offing are regular, and trading vessels may anchor at a mile west of the above islands in 7 fathoms; but

vessels of war are recommended to anchor 3 or 4 miles off shore in 17 fathoms.

Landing is never practicable in ordinary boats, and none ought to attempt to cross the bar or land through the surf without a native pilot.

Tides.—It is high water, full and change, in Gallinas river at 6h. 45m.; springs rise 4 feet.

Sulima river.—The Sulima, 3 miles south of Gallinas river, has the appearance of a considerable stream. There is no ordinary landing. A small wooded island stands conspicuously in its mouth.

Manna river.—At 6 miles SE. of Sulima river is the small river Manna, which, though nearly closed by sand spits extending from both sides, affords access across the bar to surf boats. Generally speaking the banks of the river are high, and there is no mangrove. A small wooded island is in the entrance. A strip of territory on the shore between Sulima and Manna rivers was ceded to the British government in 1883.

The Republic of Liberia commences at this river.

Manna point, low and rocky, with rocks above and below water extending ⅓ mile from the shore, lies SE. of Manna river, distant 4½ miles. The high land in the interior, NE. of Manna point, is visible from a considerable distance, and is the first seen when approaching the coast from the northwestward.

Coast.—At 8 miles SSE. of Manna point is cape Mount, the coast between forming a bay about 2 miles in depth, into which flow the Suguri and Cape Mount or Marfa rivers. These rivers, with Fisherman lake, have a common outlet at 2½ miles north of cape Mount, across which the surf breaks heavily.

Suguri river.—From the mouth of the Suguri a line of soundings was run to the head of deep-water navigation, at the place where was formerly situated the old town of Suguri, the site of which is now marked by a small clearing overgrown with low brush and grass, with here and there a narrow path. At 700 yards from the mouth of this river a series of sand flats greatly obstruct its navigation, and even at high water they were found difficult to pass over with a boat. These flats obstruct the river for 300 yards, when a narrow neck of the river is reached, which is 100 feet in width and ½ mile from its mouth. At this point the river commences to widen, with an average depth of one fathom, which can be carried to the head of navigation, about 5 miles above the flats. Several small but grotesquely shaped islands are situated near the right bank, 1½ miles above the flats. These islands are composed of sand dunes, and are covered with thick brush interwoven with vines. The left bank of the river is bold in most cases, and is densely covered with mangrove bush, except in a few spots which contain forest trees and a few straggling thatched huts, situated on a slight rise of ground. This section of country becomes inundated during

the rainy season. The soil is composed of clay, decayed animal matter and wood, which gives forth a very unpleasant odor when trod upon. The stagnant pools of water in this section contain poisonous matter, leaving a very unpleasant taste in the mouth like that of copper. The scattered flats are covered with a tall and very fine grass which grows luxuriantly even in the dry season.

Halfway up the river, on both banks, is Vye town, or Salt town, and here commences the manufacture of salt, which is entirely carried on by the natives, who are Vyes. The salt is collected from the flats which indent both banks of the river at this point. Several small rivulets were examined on the west bank, which were found to extend back but 200 or 300 yards, when they become impassable from their narrowness and small depth. The general direction of the Suguri river is NNW. and SSE. The head of deep-water navigation of one fathom terminates in a cove surrounded by high bushes, and extends to within 300 feet of the sea beach, the intervening space being the old site of the town of Suguri.

Fisherman lake.—The channel, which is the outlet to the lake, is 3 miles in length and averages ½ mile in width; it and the Marfa and Suguri rivers all meet at the same point, which is at the south point of the Suguri peninsula.

On the left-hand bank of the lake channel, one mile from its mouth, borders the sloping sides of Cape Mount peak, along the water front of which is situated the small town of Roberts port and the Liberian and German trading houses. It is here that the produce of the interior, which comes down the Suguri and Marfa rivers and Fisherman lake, finds a ready market and outlet to the commercial world at large.

After passing Cape Mount island, the largest in the lake, the water has an average depth of 10 feet in the main body of the lake.

Around the head and mouth of the lake are numerous sand flats with narrow channels, which extend ¼ mile from shore. The bottom of the lake is composed principally of red and gray sand.

About one mile south from the village of Bendu is a prominent rocky point extending ½ mile into the lake. This lake is about 10 miles in length and 6 in width, with a circumference of about 37 miles, and covers an area of nearly 100 square miles, including its indentations. Several villages are situated upon its shores, the largest of which is Bendu, located on the NE. shore, distant 10 miles from cape Mount. Bendu is the depot of transfer of all of the trade of the Vye section between cape Mount and Bopura.

Marfa river.—The scenery along the river is attractive and constantly changing because of the very circuitous windings of this narrow channel, which averages 160 feet in width, with bold, steep banks, covered principally with a heavy overhanging foliage, overshadowed by the outspreading

branches of toppling trees with scattered plats of tall eel grass intervening. In many places along the river large swamps extend back from its banks, which are impassable only in the wet season. This river carries an average depth of 12 feet to Mahquimba. The channel is narrowed in some places by its rocky sides and bottom. The whole nature of the soil, in most all cases, is composed of a rich loam and black muck mixed with sand and some gravel. Occasional strata of rock cross the river bed, lying in a NW. and SE. direction. No specimens of any value abound in this section. On a line extending across the peninsula, formed by the junction of the Marfa and Suguri rivers intersecting the banks of each ½ mile from their mouths, will be found pools of water strongly saturated with copper.

Cape Mount.—The headland of cape Mount consists of several hills which rise to the height of 1,066 feet above the sea and which when seen from a distance have the appearance of a large island. The western point of the cape is clear of offlying dangers, and the base of the Mount from thence for 3 miles to the southeastward, is formed by a succession of rocky points and small sandy bays. There the coast again sinks into a low continuous beach of light brown sand; an unbroken forest covering the face of the country up to the summit of the cape, and extending without intermission for 40 miles in a southeastery direction to cape Mesurado.

Half Cape Mount river.—About halfway between capes Mount and Mesurado, there is a considerable stream named Half Cape Mount river, but in the dry season it is quite closed by a bank of sand which extends across its mouth.

Anchorage.—During the dry season vessels of war occasionally anchor in 12 fathoms, at 3 miles off shore, between cape Mesurado and Half Cape Mount river.

St. Paul river.—At 8 miles ESE. of Half Cape Mount river there is a small stream named the Po, the entrance to which may be known by a number of black rocks on the beach; and 4 miles north of cape Mesurado there is a fine wide stream known as St. Paul river. A few rocks extend ¼ mile from the beach, for a distance of about 4 miles north of St. Paul river. From the south entrance point of the river a dry sandy spit extends to the NW., terminating in a shallow bar, curving toward the northern shore, and leaving a narrow channel for boats, with 7 feet in it at low water.

Caldwell settlement.—On the banks of St. Paul river and along the outer shore there are several native villages and some American factories, as well as a large settlement at Caldwell, 2 miles from the entrance, on the south bank of the river.

Mesurado river.—At 3 miles southward of St. Paul river, the Mesurado issues from behind the cape of the same name. Its entrance is ren-

dered uncertain both in depth and position, for the sand banks off it yield alternately to the westerly swell and to the heavy freshets produced by the periodic rains breaking through; sometimes it is found close to the foot of the cape, and sometimes ½ mile to the northward, but usually there is from 3 to 9 feet on the bar, which is generally unsafe for any but surf boats.

Stockton creek.—This creek, 5 miles long in a northerly direction, affords a back communication for boats between the Mesurado and St. Paul rivers; the banks of this creek and Bushrod island, west of it, contain several thriving villages of American settlers.

Cape Mesurado.—The northwestern extreme of the peninsula of Mesurado is high in comparison with the adjacent land; it is of rocky formation, covered with vegetation, and steep to. When first seen from the westward it appears like an island.

Light.—From a lighthouse painted red and situated on the summit of cape Mesurado, at an elevation of 240 feet above the sea, is exhibited a fixed white light, that is of small power, seldom seen more than 5 miles. Its maximum visibility is 6 miles, but never to be depended on.

The mast SW. of the lighthouse is used for signals only.

Monrovia.—The principal establishment on this part of the coast is the town of Monrovia, which stands on the southern side of Mesurado river, immediately under the high land of the cape, and which is the residence of the president of the Liberian republic, and the seat of government.

There are no quarantine regulations nor is there a hospital.

The United States is represented by a consul general and a vice consul.

Population.—In 1881 the population was estimated at 6,000, of which above 2,000 are Liberians.

Mails.—The outward and homeward bound mail steamers call three times a month respectively.

Supplies.—Wood in any quantity and water can be procured. Ship's boats may water in the river about 2 miles up, filling their casks from the stream; but during the dry season, it may be necessary to send boats nearly 7 miles up the river to obtain water in any considerable quantity. Fresh meat, vegetables, and various small stores are occasionally to be obtained from the settlers at the town. No coal.

Tides.—It is high water, full and change, in Monrovia bay at 6h.; springs rise 6 feet.

Anchorage.—The usual anchorage for large vessels in Monrovia bay is in 7 fathoms, sand, with the west extreme of cape Mesurado being S. 11° E. (S. 9° W. mag.), the lighthouse bearing S. 25° E. (S. 5° E. mag.) and the center of the town S. 43° E. (S. 23° E. mag.).

Landing.—Crossing the bar of the river can generally be done in a ship's boat, provided she is manned by Krumen and steered by one acquainted

with the locality. When inside the bar, the landing is good, either at the pier or alongside a stone jetty a little higher up.

The channel at high water is near Ashmun point, but at low water the deepest channel is round the north extreme of the breakers, which are well marked.

Coast.—From cape Mesurado to the SE. the coast is formed by a sandy beach, and the whole country is covered with forest. At 9 miles southeastward from the cape there is a low point, off which lie a few rocks, and close within the point there is some high land. From thence to Junk river, a similar low coast continues for 20 miles, with lagoons between the trees and the beach forming long narrow lakes with a few shallow outlets to the sea, and into which several rivulets appear to drain the water of the adjacent country. Two hillocks, named the Crown and the Coxcomb, lie NE. of the largest of these lagoons.

Hoopers patch.—N. 76° W. (N. 56° W. mag.) of the entrance to Junk river, distant 2¾ miles, and 1,200 yards from the shore, is a rocky shoal, named Hoopers patch; it is of irregular form, about a mile in length, and the least depth of water on it is 2½ and 3 fathoms.

About 1½ miles ESE. of Hoopers patch there is another small 3-fathom shoal, from which Marshall point bears N. 56° E. (N. 76° E. mag.) distant 1⅓ miles, and Bassa point S. 65° E. (S. 45° E. mag.), distant 2¾ miles. The ground immediately round it is in some places foul, but between it and the shore the bottom shoals gradually to 4 fathoms, at the steep edge of the bar which fronts little Bassa and Junk rivers. To avoid this shoal, as well as Hoopers patch, vessels when passing should not come within the 10-fathom line.

There is a passage 800 yards wide between these shoals and the shore, in which the depth is from 5 to 6 fathoms.

Vessels using this passage should keep near the shore in about 5 fathoms.

Junk river.—From Marshall point, its western entrance point, a tongue of sand, partly dry and partly covered with heavy breakers, extends ¾ mile to the southward, and close round the southern edge of these breakers is the entrance to Junk river. On the bar, there are only 4 feet at low water, and the channel is very narrow; but inside it deepens to 1½ and 2 fathoms; the deepest water is found by steering toward the eastern shore, round the hook at the extremity of the tongue of sand.

Marshall, a Liberian settlement, stands on the west side of Junk river, about a mile from the bar; abreast of it there are 3 and 3½ fathoms. At about ¾ mile above Marshall the Junk river divides into two branches, one running east and the other NW.; the eastern branch is said to be navigable for a distance of 18 miles, with a depth in it of from 2 to 5 fathoms.

Tides.—It is high water at Junk river, at full and change, at 5h. 45m.; springs rise 5 feet.

Little Bassa river.—The mouth of this river is one mile SE. of Marshall point, but it is so completely obstructed by the prolongation of the sandy tongue from that point that it is inaccessible even to boats.

Anchorage.—Vessels may anchor off either Junk or Little Bassa rivers in 7 or 8 fathoms, on a clear bottom of sand and mud; northward of the parallel of Brazier point the ground is foul.

Bassa point is a small rocky cliff, thickly wooded, with sandy bays on either side. Inland from it, distant 10 miles, and bearing N. 36° E. (N. 56° E. mag.), there is a remarkable hill named the Saddle, which rises 1,071 feet above the sea, and appears to be the western extremity of a range of high land, extending 24 miles in a southeasterly direction to mount St. John. These hills are visible for 30 miles in clear weather, and are useful marks on this low coast.

Long Reef point.—At 9 miles ESE. of Bassa point is Middle Bassa, where there is another Liberian factory; and at 3 miles farther in the same direction lies Long Reef point, so named from a barrier of rocks, which, commencing about one mile north of the point, extends parallel with the shore for a distance of about 4 miles, at a distance of 600 yards from the coast. The ground in the vicinity is all foul, and S. 5° E. (S. 15° W. mag.), distant 2½ miles from the point, in the stream of 10 fathoms, there is a sunken danger with 4¼ fathoms on it.

Lagoons.—Between Bassa and Long Reef points there are some lagoons at the back of the beach, and at about 1½ miles SE. from the former point is a small red and white cliff, which renders the spot remarkable.

St. John river.—A slightly indented coast, wooded throughout, and apparently populous, extends from Long Reef point to Grand Bassa point, a distance of 11 miles. North of the latter, distant 2½ miles, a considerable river, named the St. John, and two smaller streams, the Mechlin and Benson, discharge themselves through one common opening into the sea.

Grand Bassa.—The American colonists of Liberia have two small settlements at St. John river—Edina, on the northern side of the opening, and Grand Bassa, on the opposite bank. As usual with almost all the rivers on this part of the coast, the entrance is obstructed by a shallow bar, the least dangerous passage over which is close to the sandy spot off Macdowell point, its southern entrance point. Inside the water deepens to 2 and 3 fathoms abreast of each of the settlements.

Landing at Grand Bassa at times is dangerous. In very fine weather vessels of 200 tons have crossed the bar.

The coast in the vicinity of Grand Bassa is low, but at about 10 or 12 miles inland there is a chain of hills distinctly seen in clear weather.

Anchorage.—About a mile outside, or S. 59° W. (S. 79° W. mag.), of the opening of St. John river, there is good anchorage in 6 or 7 fathoms, black

mud, with the northern houses of Edina bearing N. 25° E. (N. 45° E. mag.).

Niobe reef.—Several patches of foul ground and one dangerous reef, named the Niobe, on which the sea breaks furiously, lie NW. of the entrance to St. John river. The outer edge of Niobe reef is a mile off shore, and bears N. 82° W. (N. 62° W. mag.), distant 2⅓ miles from the southern houses of Grand Bassa settlement, so that vessels standing in should not bring them to bear southward of N. 87° E. (S. 73° E. mag.).

Between Niobe reef and Edina point, the northern entrance point of St. John river, are two smaller groups of breaking rocks. One of these lies ½ mile eastward of Niobe reef, south extreme, the other 400 yards S. 47° W. (S. 67° W. mag.) of Edina point.

Waterhouse bay.—Southward of Macdowell point the shore recedes a little, forming Waterhouse bay, which is full of detached rocks and reefs. The northernmost of which Snapper reef lies ½ mile west of Waterhouse point, and always breaks.

Rock.—A rock of small extent, consisting of several sharp pinnacles, with a least depth of 2¼ fathoms at low water spring tides, lies with the agent's house, Grand Bassa bearing N. 27° E. (N. 47° E. mag.), distant 1 $\frac{9}{10}$ miles, and the outermost Dhuat rock S. 52° E. (S. 32° E. mag.). From the temporary character of the buoy marking this danger, dependence should not be placed on its being in position.

Grand Bassa point, composed partly of sand and partly of rocks, forms the south entrance point of Waterhouse bay. From the point the Dhuat ridge of rocks projects ¼ mile to the N. 65° W. (N. 45° W. mag.), and extending the same distance from their extremity, a sunken reef, named Yellow Will, assists in sheltering from the sea the little nook known as Bassa cove. Bissaw river runs into this cove, but it is inaccessible to boats.

Tides.—It is high water, full and change, at Grand Bassa at 5h. 50m.; springs rise 4 feet.

Tobokanni.—At 4¼ miles SE. of Grand Bassa point is Tobokanni, a large native village; the coast between being thickly wooded, and formed of small rocky points and sandy bays.

Tobokanni rock.—At nearly a mile SSE. of the village the land assumes the shape of a low angular point with a projecting reef, which terminates in a detached block of stone a few feet above water, named Tobokanni rock. At about a mile S. 59° W. (S. 79° W. mag.) of the point there is a sunken rock, on which the sea constantly breaks.

Coast.—Continuing to the southeastward from Tobokanni village the coast is in general rocky, with some sandy bays between the points, and these are fronted by numerous reefs, which extend in some places ½ mile from the shore, leaving a boat channel within them.

Young Sesters.—These reefs extend 8 miles along the coast, as far as Trade town, but their continuity is broken at Young Sesters, about 4 miles SE. of Tobokanni rock, a place with which trading vessels sometimes communicate; and the same opening admits boats to pass inside of the reefs to New Sess river, the mouth of which is always accessible to canoes.

Trade town is large and populous, on the western bank of a small river about 4 miles south of Young Sesters; it has both an American and an English factory.

Anchorage.—There is anchorage off Trade town at 1½ miles from the town in 10 fathoms, muddy bottom; mount Tobacco bearing N. 67° E. (N. 87° E. mag.), and the town about N. 50° E. (N. 70° E. mag.).

Trade Town rock.—At nearly 2 miles S. 43° E. (S. 23° E. mag.), of Trade town and about a mile from the shore, there is an isolated detached rock, on which the sea always breaks.

Little Kulloh, or Kurrau, river, 4 miles SE. of Trade town, is small but accessible to boats. Fresh water may be obtained there from both wells and springs. At the town there is good landing under the shelter of a rocky point.

Little Kulloh rocks.—At ¾ mile S. 43° E. (S. 23° E. mag.) of the town of Little Kulloh, and 200 yards off shore, there is a sunken rock; and farther on, in nearly the same direction, but more than ½ mile off shore, there are several other rocks, with a channel of 3 fathoms between them and the mainland. The coast in the vicinity of these rocks rises in rocky cliffs to 40 and 60 feet above the sea, with large irregular blocks of granite on the beach, over which the sea breaks heavily.

Grand Kulloh.—The entrance of Grand Kulloh river, 5 miles SE. of Little Kulloh river, is closed by rocks and sand; and from thence to the southward the shore becomes low and undulating, with a coast line formed by numerous rocky points and sandy bays, off which, at a distance from 200 to 400 yards, are some rocks with a passage for boats inside them. Grand Kulloh village is 1½ miles SE. of the entrance to the river. Off Errick, close NW. of Grand Kulloh village, there is a large black rock connected by a reef to the shore.

Tembo river, 3½ miles SE. of Grand Kulloh village, is a small stream ½ mile northward of Tembo point, and only occasionally accessible to boats. There is a small British trading factory at Tembo.

Tobacco mount, a conical hill 880 feet high, situated 13 miles northward of Tembo river, is a valuable mark for recognizing the anchorages on this part of the coast.

Fen and Manna rivers.—From Tembo river to Grand Sestos, the coast is low and thickly wooded, with a sandy beach and some offlying rocks. The entrances to Fen and Manna, two small streams, are in the above space; the former is nearly closed by a ledge of black rocks, but canoes can enter

by keeping close to the shore on the western side of them; at the mouth of Manna river may be seen the remains of an old factory.

Fen rocks.—At ¾ mile south of Fen river are the Fen rocks, on which the sea breaks; other sunken dangers lie eastward of them, and the soundings are very irregular for 5 miles between them and Manna rocks.

Manna rocks lie a little more than a mile from the shore, and N. 54° W. (N. 34° W. mag.) of the entrance to Sestos river distant 4 miles, they are of a black color, and a little above high water; a shoal bank extends ½ mile SE. of Manna rocks. There are several sunken rocks in this vicinity on which the sea breaks; one bearing from Manna rocks N. 25° W. (N. 5° W. mag.), distant 1,200 yards; another N. 25° E. (N. 45° E. mag.), distant 800 yards; a third N. 75° E. (S. 85° E. mag.), distant 1,200 yards, and others at a distance of a mile bearing S. 25° E. (S. 5° E. mag.); all of these may be avoided by keeping in the offing in not less than 12 fathoms.

Sestos bay—Sestos point lies 4 miles S. 43° E. (S. 23° E. mag.) of Manna rocks, and between them is Sestos bay, in which the soundings are irregular both in depth and quality of bottom, which generally consists of coarse brown sand or black mud.

Anchorage.—Convenient anchorage in 5 and 6 fathoms will be found with St. George point, ¾ mile northward of Sestos point, bearing S. 65° E. (S. 45° E. mag.), distant about ¾ mile; and Sestos point bearing S. 20° E. (south mag.). Wood and water may be easily obtained here.

Tides.—It is high water, full and change, in Sestos bay at 5h. 20m.; springs rise 4 feet.

Sestos river flows into the southern part of Sestos bay, its entrance is obstructed by an extensive bar extending from St. George point (off which are some large, black, detached rocks), to about a mile north of Isaac point, the northern entrance point.

A Liberian factory has been established on St. George point.

Bar.—In the middle of the bar (which breaks heavily) there are some rocks, lying 800 yards N. 11° E. (N. 31° E. mag.) of St. George point, which divide the channel into two parts, but in neither of them is the depth more than 9 feet at high water. The floods during the rainy season, however, produce such changes in the spits which project from the rocks or from the opposite points that it is always advisable when entering, to employ a native to pilot the boat. After crossing the bar the water deepens to 2½ and 3 fathoms, but again shoals, when past the narrows, to one fathom.

Sestos reef.—Off Sestos point there is much foul gound; a broad reef projects from it for a distance of ½ mile to the southward; a rock with 3 feet on it lies close south of this reef; and S. 3° W. (S. 23° W. mag.), distant 1⅓ miles from the point, a schooner is reported to have struck in 11 feet, though 5 fathoms was the least depth the surveying boats could find in the assigned position.

Spence rock, on which there is 12 feet water, and which usually breaks, lies S. 62° W. (S. 82° W. mag.), distant 1¼ miles from Sestos point; from the rock, the factory on St. George point bears N. 50° E. (N. 70° E. mag.).

Corisco rock, on which the *Corisco* was wrecked, has about 16 feet water over it, and lies approximately 5½ miles N. 77° W. (N. 57° W. mag.) of Sestos point; approximate latitude 5° 27′ N., and longitude 9° 45′ W.

Directions.—Sestos reef and the above-mentioned rocks are the more dangerous, because they are all so steep that the lead can give little or no warning of approach. As no good clearing marks can be given, strangers should employ a pilot in entering the bay for the first time.

Pua and Pobamo rivers.—From Sestos point southward to Rock Sess factory the coast forms a sandy bay, interrupted by two small rivers—Pua, 3½ miles eastward of the point, and the Pobamo, distant 7 miles in the same direction. The former is quite closed by rocks and sand in the dry season, but during the rains it is entered by canoes. The Pobamo carries 6 feet water, and may be entered close to the beach on the NW. side, where the water is tolerably smooth, being there sheltered by a ledge of rocks which extends from the southeastern point of the entrance and forms a kind of natural breakwater.

Pobamo rocks.—Westward of this ledge, and extending to Rock Sess factory, with a passage inside of it for boats, there is a broad reef, which commences about a mile west of the mouth of Pobamo river. Westward of this reef there are several rocks, two of which always show. Pobamo rock is low and black, from it the SE. entrance point of Pobamo river bears S. 88° E. (S. 68° E. mag.), distant 1¾ miles; a small sunken danger bears N. 25° E. (N. 45° E. mag.) of Pobamo rock, distant ½ mile, and another rock bears N. 59° W. (N. 39° W. mag.) from it at the same distance.

A rock above water, and like those which have been described, steep-to and isolated, lies S. 31° W. (S. 51° W. mag.) of the entrance to Pobamo river, distant one mile.

New river.—A small river runs into the sea at Rock Sess point, and a factory will be seen a little farther to the SE. At a mile SE. of the factory lies New river. The intermediate bay is obstructed by sunken rocks, though boats will find a passage of 4 and 5 fathoms between them.

Diabolitos reef.—New river is sheltered by an extensive reef, upon which are several black rocks which retain their Portuguese name of Diabolitos. Foul ground with irregular soundings extend fully 2 miles to seaward of this reef, and though nothing less than 3 fathoms was found, yet on the two shoals of 4½ and 5½ fathoms, 2 miles southwestward of New river, the sea was seen to break.

Bruni river.—At a mile south of New river there is another rivulet without a practicable entrance; and at 2 miles farther south a long spit

has been formed by Bruni river, which is seen over it, running in a parallel line to the coast for upwards of 1½ miles. In the rainy season the freshets occasionally break through this spit, and convert it into a long narrow island. The entrance is always open to light boats and canoes, though much obstructed by rocks and sand.

Baï Ya, or Devil rock.—There are several rocks off Bruni river, both above and under water; the most conspicuous of them is the Baï Ya, one mile from the shore, standing 60 feet above the sea, and capped with dark shrubs. Northward of it, distant 1½ miles there are three sunken rocks which generally break; to the eastward, between it and a factory, standing on the shore 1¼ miles SE. of Bruni river, known as Spence factory, there are some rocks above water, with a detached reef to the southward of them, and an isolated danger westward of them.

Baï Ya rock appears white when seen against the coast line.

Westward of Baï Ya rock there are four other rocks. The nearest, which is dry, lies ½ mile S. 31° W. (S. 51° W. mag.) of it; the second (Outer rocks) bears S. 20° W. (S. 40° W. mag.), a little more than a mile distant, and is of some extent, part of it shows above water; a third, bearing S. 53° W. (S. 73° W. mag.), and nearly 1½ miles distant, is small, but carries only 4 feet water; and the fourth, lying N. 54° W. (N. 34° W. mag.) of the rock, distant not quite a mile, is only seen by its breakers.

Sangwin river.—Eastward of Spence factory the coast forms a bight, and then, after passing the small river Kuzu, and 2 miles of straight sandy beach, the Sangwin river is reached. This is one of the principal streams that water this part of the coast. At first sight it is difficult to perceive the entrance, as a long ledge of rocks from the southern entrance point (Wilson point), and a high sandy spit from the northern point, seem both to cross over to the opposite shores; but it is possible to carry 10 feet water into the river, by keeping in the deepest channel, which will be found between Wilson point and the rocky shoal ¼ mile westward of it. The channel is very narrow, and on rounding Wilson point it deepens to 5 fathoms till the narrows are passed.

Fresh water.—Towards the last quarter of the ebb tide the water at Sangwin point, on the north side, just within the entrance, is fresh and good; and when the bar is smooth, it will be found a convenient place for obtaining wood and water.

Tides.—It is high water, full and change, in Sangwin river at 5h. 15m.; springs rise 4 feet.

Lagoon.—Close east of Sangwin river, and just within the beach, there is a lagoon with three branches, which in the rainy season are probably connected with the river.

Baffu point lies nearly 5 miles SE. of the mouth of Sangwin river, the intermediate coast receding so as to form a deep bay (Baffu bay), into

which two small rivers discharge close north of the point, and in which there is much foul ground, though the beach seems to be generally clean.

Baffu rock.—Vessels working along shore should not approach this coast too closely, for Baffu rock, on which there is but 12 feet water, lies in the middle of the bay, bearing from Baffu point N. 57° W. (N. 37° W. mag.), distant 2⅓ miles, and from Wilson point, at the mouth of Sangwin river, S. 29° E. (S. 9° E. mag.), distant 2¾ miles.

Baffni river.—The northernmost of the two rivers lying north of Baffu point, is named the Baffni, and has a very narrow entrance, 6 feet deep; the other is closed by a shallow sandbar, and the rivers are connected by one of those narrow lagoons, which are so common on this part of the coast.

Directions.—Baffu point should not be approached within ½ mile to the westward, as there is a sunken rock off its pitch; another rock lies close southward of it, and irregular reefs ¾ mile in length project to the northward. A fair anchorage, however, may be taken in 8 fathoms, mud and sand, with the point bearing S. 59° E. (S. 39° E. mag.), about a mile distant.

Coast.—From Baffu point to Tassu point the coast trends ESE. for a distance of 6½ miles. A low and thickly wooded country lies between them, with several streams of water barred up by the beach; many rocks lie near the shore, as well as at a short distance in the offing.

Kru country.—About this part of the coast the Kru country begins; and its numerous inhabitants, whose superior industry and docile habits, when compared with other African tribes, are proverbially known.

Communication.—Mail steamers leave Liverpool every Saturday and alternate Wednesdays for the Kru coast.

Tuba river.—Between Tassu point and the next point of land to the southward issues the small river Tuba, in front of which there is a high rocky ledge which divides the channel; the western branch is the safer, but at low water there are not more than 3 feet in it.

Sha rock.—Off Tassu point, and in the stream of 9 or 10 fathoms, there is a long range of rocks and dangers; three of them are above water, the Sha, Wya, and Keoba. Sha rock lies 2 miles westward of Tassu point; there is deep water round it, except to the northward, in which direction breakers extend about 300 yards.

Wya rock.—This rock bears S. 51° E. (S. 31° E. mag.) of Sha rock, distant 1½ miles, and S. 36° W. (S. 56° W. mag.) of Tassu point; it is a large rock, with reefs ½ mile in length, extending both to the NNW. and SSE.

Keoba rock.—At about a mile S. 65° E. (S. 45° E. mag.) of the southern reef off Wya rock and south of Tassu point there is a rock with 9 feet over it, and at another mile farther on is the large rock above water

named Keoba. S. 65° E. (S. 45° E. mag.), distant one mile from Keoba rock there are breakers; and at 3 miles S. 51° E. (S. 31° E. mag.) of it, with Butu point bearing N. 59° E. (N. 79° E. mag.), lies Yule rock, the southern of this chain of dangers, which extend almost 7 miles from Sha rock, in a direction nearly parallel to the coast.

Little Butu is a large village about 2 miles ESE. from Tassu point, and 4 miles farther in the same direction is Grand Butu on a projecting point of the coast, behind which lies the mouth of Grand Butu river. In the space included between the line joining Keoba and Yule rocks and the shore, and between Little and Great Butu, the general depth is 6, 7, and 8 fathoms, but interspersed with many shoals, the particular description and positions of which would be useless. The shore is likewise covered with large rocks; several small rivulets expend themselves in the sandy beach, and the whole coast is densely peopled.

Grand Butu.—Grand Butu point is easily recognized by its projecting form, by the town upon it, and by a hill a mile to the southeastward, covered with trees, and 266 feet high. A river winds round between the foot of this hill and the coast, after having run for several miles parallel to the shore, and is apparently a branch of the Sinu river. A few rocks lie close off Grand Butu point, but from thence to Sinu bay the coast, though low, has a clean sandy beach, and between Yule rock and Sinu bay there are no detached shoals, so that vessels may stand in with safety; the soundings, however, are irregular, with occasional patches of rocky ground, necessitating care in anchoring.

Blubarra point.—This point forms the southern extremity of Sinu bay; it is composed of three small rocky points with sandy bays between them. North point, at the mouth of Sinu river, is about 57 feet high; the middle point, on which there is a small English factory, is 41 feet high; and the land rises from South point to a height of 60 feet. Until the point bears to the eastward of NNE. no houses are seen.

Sinu bay.—At about 150 yards northward of North point there are some rocks above water named Allen rocks, with a clear passage between them and the point into Sinu river; another open passage will be found between Allen rocks and Middle reef; and a third between this latter and North reef, which extends nearly across to the northern shore. These reefs were the only dangers discovered in Sinu bay, and vessels may safely anchor at ½ mile west of Blubarra point in 8 fathoms, but the bottom should be previously examined, for it contains several small foul patches, though generally a clean sand.

Sinu river.—There are three channels by which boats may enter Sinu river—between North point and Allen rocks—between Allen rocks and a large oval sand bank to the eastward of them—and between that bank and Fishtown beach. The first is the best, and by rounding North point

closely, 5 or 6 feet may be carried over the bar at low water. The bar is very narrow, and, when crossed, the river suddenly deepens to 3 and 4 fathoms, but shoals again quickly after rounding Fishtown point, when the deepest water will be found close along the northern shore. Water and wood may be obtained here.

The American Colonization Society have built a factory on the right bank of Sinu river, a little to the northward of Fishtown point.

Tides.—It is high water, full and change, in Sinu bay at 5h.; springs rise 4 feet.

Bluba and Plassa rivers.—At 2 miles southeastward of Blubarra point the sandy beach is interrupted by a rocky projection, about a mile inland of which a small round hill will be seen, but with that exception the coast preserves its straight, low, and sandy character for 11 miles in a SE. direction to Little Kru, and a long narrow lagoon parallel to the shore, extends the whole distance, separated from the sea only by a narrow ridge of sand. This lagoon is supplied by two rivers, the Bluba and Plassa, and a single opening through the sandy barrier serves as a common outlet to the sea for both of them. Little Kru river communicates also with the lagoon, but in the rainy season it forces an opening for itself through the barrier. From Little Kru river the coast bends outward to the rocky point of Settra Kru.

Mount Plassa is a small wooded hill with a round summit 290 feet high, to the northeastward of the entrance of Plassa river and 2½ miles distant from the coast.

Dangers.—In the eastern half of the space between Blubarra point and Settra Kru there are several offlying rocks.

The westernmost of these lies about a mile from the beach, with mount Plassa bearing N. 59° E. (N. 79° E. mag.), and a little open north of the common opening of the Plassa and Bluba rivers, which bears N. 62° E. (N. 82° E. mag.). It is very small, with 6 fathoms close round it, and generally breaks.

There is an extensive rocky shoal S. 9° E. (S. 11° W. mag.) of the above opening, and N. 88° W. (N. 68° W. mag.) of the large tree at Little Kru; some of the rocks on this shoal are above water, others covered, and some only just breaking, but all steep-to.

At one mile S. 9° E. (S. 11° W. mag.) of this shoal there is a single rocky head which generally breaks; and even if it should not show, it may be easily avoided by keeping Kru rock bearing to the eastward of S. 65° E. (S. 45° E. mag.).

Kru rock is a bare irregular shaped mass of stones, with 5 fathoms close round it, except to the eastward, where it is connected with other rocks and long reefs which extend in the form of an S, nearly to the point of Settra Kru. The western edge of Kru rock bears S. 81° W. (N. 79° W. mag.),

distant 2 miles from that point, and though it is sufficiently obvious during the day, and the breakers generally audible at night, yet vessels are recommended after dark, to keep in the stream of 16 fathoms at least.

From the S-shaped reefs connected with Kru rock, other branches diverge to the NW. and NE., so as nearly to fill the space between Little Kru and Settra Kru.

Little Kru.—At this settlement there is a palm oil factory. Ordinary boats may conveniently land under the shelter of a ledge of rocks which project from the point. The large tree which marks the position of this village stands on the eastern side, and may be plainly seen from the offing.

Settra Kru.—At this settlement there is also a remarkable tree and a conspicuous house, which may be distinguished from a long distance. Boats may safely land on the north side of the point on which the village is situated; off the extreme of this point are situated some black rocks.

Kruba.—From Settra Kru, the beach trends 3 miles to the southeastward, with long ledges of dry rocks extending from the projecting points. At that distance is the village and river of Kruba, the entrance to which in the rainy season is open, and at which cattle may be obtained.

Neatano point, 1¼ miles SSE. of Kruba river, is prolonged by a reef and offlying rocks, which are nearly connected to the southern shoals off Kruba river.

Sunken dangers.—On the bearing of S. 3° W. (S. 23° W. mag.) from Settra Kru, distant ⅜ mile, there is a rock which breaks, with 7 fathoms close to it; about a mile S. 81° W. (N. 79° W. mag.) of Neatano point there is another breaker, with 10 fathoms close to; and in the space between those two rocks, but nearer to the shore, there are several detached shoals with deep water close-to. In the stream of 14 fathoms, south (S. 20° W. mag.), distant 2½ miles from Neatano point, a rocky bank with 8 fathoms over it was found; and at 1½ miles eastward of this bank, in the stream of 11 fathoms, the natives allege that there is a rock nearly awash; though the surveying boats could not find it, nor did the soundings indicate any rise in the ground, yet on this coast it is possible that such a rock may exist, as most of the dangers are steep-to. For these numerous rocks, vessels whose business leads them inshore must keep a sharp lookout, but those which are merely running along the coast are advised not to approach it within 3 or 4 miles nor stand into less water than 25 fathoms.

Sperling rock.—This dangerous rock, which is small, steep-to, and seldom breaks, has over it a depth of 9 feet and lies S. 65° W. (S. 85° W. mag.), about one mile from King Wills town, and S. 43° E. (S. 23° E. mag.), distant 4¾ miles from Neatano point. Depths of 9 to 11 fathoms were found in all directions close to Sperling rock.

Wreck.—The wreck of the steamer *Carlos*, sunk in 5 fathoms, lies ¾ mile S. 36° W. (S. 56° W. mag.) of Neatano point.

Coast.—At ¾ mile from Neatano point lies Tuto point, from which a reef extends ½ mile to the southward. From thence to Nanna Kru village the coast is a low sandy beach fronted with many rocks; and midway between them is the outlet of the small Dehweh river, with a lagoon behind the beach about 1½ miles in length, which is supplied by the two branches of this river.

King Wills bay.—From Nanna Kru village the coast bends to the southwestward for a distance of one mile to King Wills point, forming King Wills bay, near the center of which there is a small islet about 15 feet high, covered with brushwood. The shore appears to be well settled, and two small English factories have been established here for the collection of palm oil, there being tolerably good landing near them on either side of the islet, which affords some little shelter. There are a few rocks lying 400 yards westward of the point of King Wills town, and others off the point ⅜ mile further eastward; inside of these latter rocks there is a narrow 3-fathom channel.

Uro river, west mouth.—The western mouth of Uro river is 3¼ miles from King Wills point; the intermediate coast is low and sandy, with a lagoon inside the beach; a short distance east of the lagoon there is a rocky shoal, lying 300 yards from the shore, with a 2½-fathom channel between; it is steep-to on its outer side.

Swallow rocks, consisting of two ledges, which generally break, and a 4-fathom rock ½ mile SW. of them, are SW. of Uro river, west mouth, distant 1¾ miles. From the southern ledge the west mouth of Uro river bears N. 39° E. (N. 59° E. mag.) and is in line with a hill, 260 feet in height, which stands 2½ miles inland. There are 10 fathoms close to the ledges, and 8 fathoms within 200 yards of the SW. rock.

Uro river, east mouth.—The eastern branch of Uro river flows into the sea at 3 miles east of the western branch, and the whole space between is occupied by successive chains of rocks which extend more than a mile from the beach. This mouth is concealed from vessels in the offing by large granite bowlders, but it, as well as the western branch, is accessible to canoes. Subono, or Little Wappi, a large native village, stands on the right bank of the river near its mouth.

Wappi point.—Southeastward from Little Wappi, distant 1½ miles across a small bay, is Wappi point, near which is a small lagoon which extends in both directions along the coast, and on the side of which formerly stood another native town named Great Wappi. The outlet of the lagoon is obstructed by rocks, and a broad ledge, partly above and partly under water, extends in a westerly direction for nearly a mile from the shore.

Flat island.—Southward from the western extremity of this ledge, distant about a mile, and S. 14° W. (S. 34° W. mag.) of the opening of the lagoon

there is a rock named Flat island, known to the natives as Totwarra. There are 10 fathoms within ½ mile of this rock to the westward and southward, but on its eastern side reefs and shoals extend nearly to Middle Nifu, extending far to the southward, and almost filling the whole space between the outer reef and the shore.

Landing.—Inside of these reefs, and therefore sheltered by them there is good landing at Little Nifu, on the western side of a rocky point, on each side of which there are streams of water that are open in the rainy season.

Caution.—In 1856, at about 3½ miles S. 25° W. (S. 45° W. mag.) of Flat island, a sunken rock was found, but its exact position is not known.

Middle Nifu.—At this place there are two small rivers, one coming from the NW. and the other from the NE. they unite in a short lagoon, the outlet of which is open only in the rainy months. The town lies between these, and a mile farther eastward there is another native town named Great Nifu, off which a shallow reef projects ¾ mile in a S. 30° W. (S. 50° W. mag.) direction, with a detached rock, on which there is 3 fathoms water, ¼ mile westward of the extremity of the reef.

Dru river.—At 2 miles SE. of Great Nifu, a stream of some magnitude, known as the Dru, flows into the sea, and carries 6 feet over its bar, inside of which it deepens to 4 fathoms. The best entrance is round the southern point, which is low and rocky, with some large offlying rocks; the northern entrance point is a sandy spit, which extends well over towards those rocks. Off the mouth of Dru river there are several dangers; one of them, named by the natives the Druta, is a large block of stone which is above water; a sunken reef extends from it to the westward, and to the northward there is a large patch of foul ground. A ledge ¾ mile in length lies south of the south entrance point of the river, but there is a 3-fathom channel between them. Two breaking rocks lie to the eastward of this ledge, and the soundings in its vicinity, as well as round Druta rock, are suspiciously irregular, with rocky ground; so that, unless with a view of communicating with the shore, no vessel should venture to approach it here within 20 fathoms, or at a distance of about 3 miles.

Esereus river.—From the rocky southern point of Dru river the coast trends in a SE. direction for about 2½ miles to Esereus or Baddu river, close to the mouth of which there is a large rock 20 feet high, and some detached rocks a little to the westward of it, as well as a sunken danger on which the sea breaks; there is a channel 2 fathoms deep, suitable for boats, close along the coast inside of all these rocks.

Baddu.—Baddu consists of four towns, which stand on the coast on the western side of the entrance of Esereus river; in their vicinity the ground has been well cleared by the natives, and produces abundance of rice.

Landing.—There is tolerably good landing under the lee of the large rock above mentioned. The entrance of Esereus river is only passable by canoes.

Dead islet.—Baddu point curves to the southward from the mouth of Esereus river; it is low and sandy, but ½ mile off its pitch there are several rocks above water (the largest of which are named Dead islet) and several outlying reefs.

Baddu shoals.—The outermost of these dangers bears S. 79° W. (N. 81° W. mag.) of Dead islet, distant 2 miles, and another shoal head lies N. 76° W. (N. 56° W. mag.), ½ mile from the same islet; the several dangers in this vicinity are known by the general name of Baddu shoals.

Monkey rock.—This rock lies S. 31° E. (S. 11° E. mag.), distant 2 miles from Dead islet, and between them are several reefs and rocks, some of which show above water; Monkey rock lies 1¼ miles from the shore, and, like the breaker to the westward of it, is in the stream of 10 fathoms; the soundings for ½ mile southwestward of it are irregular, and the bottom foul and rocky.

Castle rock.—Several isolated rocks are scattered along this part of the coast; a large one named the Castle bears S. 82° E. (S. 62° E. mag.) of Monkey rock, distant 2⅓ miles; it rises steeply from a depth of 10 fathoms, and is about ½ mile from the beach. Vessels should not stand so far in as to bring these two rocks on opposite bearings.

Between the two points abreast of Dead islet and Castle rock there are several small rivers and lagoons, but they are all barred in the dry season. There is a safe channel for boats with 2 or 3 fathoms in it within 200 yards of the beach, leaving the shoals and islets outside to seaward.

Feruwa river.—These shoals terminate about a mile eastward of Castle rock, and from thence to the Feruwa river the sandy beach is straight. Feruwa river, with its apparently large opening, is only accessible to boats and canoes when the bar is smooth; its western entrance point is a low spit of sand, the eastern point a bold rock, on which stands the native town of Katu.

Katu rocks.—Rocks and bowlders again front the coast at Feruwa river, there being three rocks above water near its entrance, with reefs extending from them nearly ½ mile to the southward.

A large rocky shoal was found at a distance of nearly 2 miles S. 59° W. (S. 79° W. mag.) of Katu point, with only 6 fathoms on it; and nearly in the same direction, but 5 miles off shore several canoes were fishing in the depth of 20 fathoms on a still larger patch of foul ground.

Information likewise was obtained of the existence of a third shoal of 7 fathoms, lying in the stream of 19 fathoms, but the surveying boats failed in finding it.

Pashu rock, with two rocky heads above water, lies in the stream of 9 fathoms, and bears S. 9° E. (S. 11° W. mag.), distant 1½ miles from the mouth of Feruwa river.

Coast.—From Katu point to Subbu point, a distance of 3 miles, the coast forms four sandy bays with rocky points, and is fringed by many large rocks above water and breakers, inside of which there is a boat channel. The native towns of Piccaninny Sesters and Wayako are on this coast.

Piccaninny Sesters may be recognized by three small hills 4 miles northeastward of the town.

Rocks.—In front of Wayako, at nearly a mile from the shore and ⅜ mile eastward of Pashu rock, there is a shoal of 3 fathoms, with deep water on either side of it.

Subbu rock, large and black, lies N. 76° W. (N. 56° W. mag.), distant ⅜ of a mile from Subbu point.

A sunken danger lies between Subbu rock and the shore.

A dangerous rock, with 10 fathoms round it, lies S. 42° W. (S. 62° W. mag.) of Subbu point, distant one mile; and two shoals carrying 2½ and 3 fathoms lie south of the same point, distant ⅛ and ⅜ mile, respectively.

Sesters point.—From Subbu point, a low sandy beach, clear of rocks, extends 1½ miles to southeastward, and then turns more to the southward towards Sesters point, off which are numerous shoals and rocks.

Carpenter rock.—This large rock bears S. 25° E. (S. 5° E. mag.), distant one mile from Sesters point; from the rock the highest part of Sesters hill bears north (N. 20° E. mag.). A long chain of rocks, above and under water, extends from it toward Sesters point, round which there is a very narrow 4-fathom channel. About a mile S. 25° W. (S. 45° W. mag.) of the rock, a sunken rock, position doubtful, is shown on the chart; a steamer drawing 20½ feet is said to have touched on it in 1888. Heavy sea.

Grand Sesters river.—Behind Sesters point, Sesters hill rises 210 feet above the sea, but between the hill and the point there is a narrow lagoon close inside the beach, nearly 3 miles in length, into which Grand Sesters rivers pours that portion of its waters which can not find sufficient vent over the bar. The mouth of this river is about a mile eastward of Sesters point; its western entrance point is low and sandy, while the eastern point is rocky, with a ledge extending from it almost across to the opposite shore, so as to leave a very narrow entrance, through which boats can pass only when the water is tolerably smooth.

Factory island.—On a rising ground near the eastern entrance point of Grand Sesters river stands the large native town of Grand Sesters, and two English factories, in front of which a large rock named Factory island, sufficiently breaks the swell to allow boats to run upon the beach with tolerable security.

Anchorage.—Vessels generally anchor in 13 or 14 fathoms on a muddy bottom, with Factory island bearing N. 3° E. (N. 23° E. mag.), about a mile distant. It is necessary to find out the nature of the bottom before anchoring.

Ranger point.—At 2 miles eastward of Factory island is Ranger point, with a large native village on it. The point is rocky, but the intermediate coast is a sandy beach with a few detached rocks off it and a boat channel of 2 fathoms inside them. Some rocks lie off Ranger point, extending to a distance of 300 or 400 yards. At a mile N. 36° E. (N. 56° E. mag.) of Ranger point the land rises into a kind of table-shaped hill, densely wooded, the tops of the trees attaining an elevation of 192 feet, and on the same line of bearing, 2 miles farther inland, there are two little hummocks which are named the paps.

Coast.—From Ranger point for a distance of 8 miles to the eastward the coast is low and thickly wooded, with a clean sandy beach, free from offlying rocks as far as a small river, which was open, though the surf on the bar did not permit the surveying boats to enter. Both points of the entrance are low and sandy, and there is a village on the eastern point. This river comes from the northward, with a small branch from the westward. North (N. 20° E. mag.) of its mouth and 15 miles inland there is a hill 736 feet high, which, from its shape, is named the Sugarloaf; several small hillocks lie between it and the shore. There is also a remarkable grove of trees 1½ miles east of the eastern entrance point, so that this part of the coast is easily recognized.

Garraway river.—An uninterrupted sandy beach extends 7 miles from this small river to Garraway or Tryh river, the northern side of the entrance to which is formed by a long low spit of sand, on which are two native villages known as Bushman town.

Garraway river is accessible at all times to canoes and to ordinary boats in moderate weather; the usual channel into it lies between the spit extending from the north entrance point and a large rock above water near the middle of the entrance, which is connected with Garraway point (the south entrance point) by a chain of smaller rocks; in the middle of this channel there is a sunken rock.

Bushman reef.—In front of Bushman town a shallow reef extends off shore for a distance of ½ mile. Two shoal rocks lie west of this reef, one distant ½ mile and the other a mile from it; the latter is ¾ mile from the shore, and there is a depth of 6 fathoms in the channel between the eastern rock and Bushman reef.

Garraway point, on the southern side of the entrance, is rocky, with large rocks, some above and others under water, extending south and west from it.

Rocks.—Southwest of the rocks extending from Garraway point, with a narrow channel of deep water between, there is an irregular shaped reef of considerable extent named Long patch, its NW. and SE. extremes bearing from Garraway point S. 80° W. (N. 80° W. mag.), and S. 15° E. (S. 5° W. mag.), and its southern angle bearing S. 14° W. (S. 34° W. mag.) a mile distant. Another reef, of an oval shape, named Tryh rocks, lies immediately westward of Garraway point; there is a channel into the river both east and west of it. Solitary rock lies in the stream of 9 fathoms, bearing from Garraway point S. 77° W. (N. 83° W. mag.), distant 1½ miles.

Garraway tree.—There is a remarkable tree behind Garraway town, the top of which is 200 feet above the sea; it lies north distant ¾ mile from the point, and is used as one of the objects to distinguish the position of Coley rock, which lies 7 miles in the offing. In the direction of the tree, but nearly a mile farther inland, there is also a conspicuous clump of trees.

Green islet, the eastern extremity of which is high, lies a mile eastward of Garraway point; it lies in the middle of a large breaking shoal, between which, and some sunken rocks near the beach, boats may pass in 2½ fathoms.

Shoal.—A shoal, with depths of from 16 to 36 feet of water over it, has been reported south of Garraway point. The shoal extends 1,400 yards in a NW. and SE. direction. The least depth of water is on the SE. end of the shoal, and from this end Green islet bears N. 10° W. (N. 10° E. mag.), distant 1½ miles.

Jida river.—From Garraway point the distance is 8 miles in a southeasterly direction to Fish Town point, the coast between forming a bay with a sandy beach. In this space are the entrances to three small streams. Jida river, which is the westernmost, is closely barred by sand during the dry season. At a mile westward of this river there is a rocky danger ¼ mile off shore, with a 4-fathom channel inside it and 7 fathoms close to seaward. The Jida, which flows from the northeastward, appeared to communicate with Garraway river by a narrow lagoon parallel to the coast. The town of New Garraway is built on the eastern side of the entrance.

Dia river, a small stream, the entrance to which is open and sometimes passable for boats, lies 3½ miles SE. of the entrance to Jida river. From the mouth of Dia river a long reef, on which the sea breaks with violence, extends S. 77° W. (N. 83° W. mag.) for a distance of 2½ miles; on its outer extreme there is a very shoal head, close westward of which there are 8 fathoms, and on either side north or south of the reef 6 fathoms.

Mano river.—In the bight of the bay, 1¾ miles SE. of Dia river entrance, lies the Mano river, which is also open, though but seldom accessible, from the high surf that rolls in along Fish Town point. About midway between Dia and Mano rivers a reef, which is steep-to, extends more than ½ mile from the beach. A little rocky islet lies close south of the mouth of Mano river.

Fish Town point.—On this point, which rises about 40 feet above the sea, stands the large native town of the same name, and near it a factory for collecting rice, which abounds here. On the bearing of N. 64° E. (N. 84° E. mag.) from the point, distant 3¾ miles is the Table hill of Kabla, on the northern part of which there is a grove of trees which stands 290 feet above the sea, and is a valuable mark for clearing the several dangers lying westward of cape Palmas.

Fish Town reef.—A reef projects ⅔ mile in a southwesterly direction from Fish Town point, with 7 fathoms close round it; and there is a detached breaker with deep water close to it lying one mile N. 68° W. (N. 48° W. mag.) of the point.

Cape shoal.—Southward of these breakers, at the distance of 2 miles S. 38° W. (S. 58° W. mag.) of Fish Town point, is Cape shoal, a ledge of rocks always visible, the sea generally breaking on them with great violence, and sometimes also on two shoal heads a little to the eastward of the main shoal. The channel between Fish Town reef and these rocks is rather more than a mile wide, and the depth in it varies from 5½ to 8 fathoms. The bottom is generally of coarse brown sand, with several rocky patches.

Coley rock.—This rock lies 2¼ miles S. 64° W. (S. 84° W. mag.) of Cape shoal; it is a sharp pinnacle, on which the least water is 6 feet, with 10 fathoms to the eastward, and 13 fathoms close to its other sides. From this very dangerous rock the remarkable tree at Garraway bears N. 18° W. (N. 2° E. mag.), distant 7½ miles; Kabla hill bears N. 58° E. (N. 78° E. mag.); Rock Town point bears N. 80° E. (S. 80° E. mag.); and cape Palmas S. 88° E. (S. 68° E. mag.), distant 9½ miles. The ground between Coley rock and Cape shoal is very uneven, having several rocky heads with 4 to 5 or 6 fathoms over them and deeper water close around them; two other shoal spots will be found west of Coley rock, one of 6 fathoms at 600 yards distant, bearing S. 80° W. (N. 80° W. mag.) from the rock, and another of 5½ fathoms, known as Outer patch, bearing S. 69° W. (S. 89° W. mag.), nearly 2 miles.

Current.—The current sets over Coley rock and in the vicinity with great strength, causing this rock and adjacent shoals to be dangerous of approach in thick weather.

Directions.—The quality of the bottom in the vicinity of these shoals is as variable as the depth, being of rock, coarse sand, gravel, and coral. Vessels bound to cape Palmas with a leading wind may safely pass inside Cape shoal, which is always distinguishable by its breakers; and by keeping in nearly mid-channel between it and Fish Town reef, there will be 7 fathoms water; at night it is advisable to pass outside of all, with cape Palmas light bearing N. 79° E. (S. 81° E. mag.); or if the light be not seen, in 25 or 30 fathoms.

Middle point.—At Middle point, 1¼ miles eastward of Fish town, there is a rivulet and native town; a reef projects about ½ mile SW. from the point. About midway between Middle and Rock Town points is a reef ¼ mile off shore.

Rock Town point, where there is a large native settlement on each side of a small river, which is quite barred in the dry season, is 54 feet above the sea, and is 1½ miles from Middle point; it makes very distinctly to vessels in the offing. A succession of reefs extends from the point, nearly a mile in a westerly direction, but inside them, there is a narrow 3½-fathom channel.

Two single palm trees are situated close to the beach, distant respectively 1¾ and 2 miles from Rock Town point.

Coast.—From Rock Town point a sandy beach of about 4 miles in length, and but little curved, extends to Palmas river. In this space there are two reefs which show themselves by heavy breakers. The outer lies S. 49° E. (S. 29° E. mag.) of Rock Town point distant one mile, and rather more than ½ mile off shore; the other reef is not quite ¼ mile off shore, and lies 1⅛ miles eastward of Rock Town point, with a narrow channel of 3½ fathoms inside it; between the two reefs there 5¼ fathoms.

Cape Palmas.—This cape is a rocky peninsula, joined to the mainland by a low sandy isthmus; the highest part of the cape, near the middle, is elevated 74 feet above the sea. Its eastern extremity is covered by a number of native houses named Grand town, and on the remainder of the peninsula a settlement named Harper, was formed by the Colonization Society of Maryland in 1835. The white houses at Harper are conspicuous when seen from the eastward.

Light.—A lighthouse stands on cape Palmas. From it is exhibited a fixed light, seldom visible more than 2 or 3 miles; the light is not to be depended on, as it frequently goes out, and is not relighted during the night.

When approaching the cape from the eastward the lighthouse is not visible until within 6 or 7 miles, being much the same color as the surrounding trees and background. The cape should be approached with caution, as a great mirage generally hangs above and over the land making bearings of definite objects difficult to obtain.

Palmas river.—The river flows into the sea on the northern side of the peninsula of cape Palmas; its entrance is about 100 yards wide, but several rocks lie in the channel. At low water, a general depth of 3 feet was found on the bar, inside of which, as far as the surveying boats went, the depth seldom exceeded a fathom.

The rollers on the bar are occasionally sufficiently heavy to prevent communication by ordinary boats.

Cape Palmas rocks.—In the direction of the length of the peninsula there are three groups of rocks lying off cape Palmas; the eastern of these, situated 200 yards from the cape, has 9 feet on it at low water; the middle

rock is partially uncovered at low water, and lies 400 yards from the cape; and Outer rock, which is very small, and carries 9 feet water, lies about ½ mile S. 72° W. (N. 88° W. mag.) of the extremity of the cape. The soundings in the vicinity of these rocks are irregular, and the bottom foul; but on either side of the inner rock there are channels with 3 fathoms water; between the large middle rock and Outer rock there is a wide opening, in which there is a depth of 4¼ fathoms. Strangers, however, should not use these passes, even when coming from the eastward and bound to Harper anchorage, but should keep outside all in not less than 14 fathoms.

Yoruba rock of 1¾ fathoms, on which the steamer *Yoruba* struck in 1873, lies N. 83° W. (N. 63° W. mag.) of Cape Palmas lighthouse, distant nearly 900 yards.

The wreck of the *Yoruba* (on the beach) bears N. 19° W. (N. 1° E. mag.) from Cape Palmas lighthouse, distant 1,400 yards. In 1887, the wreck was still in existence and formed a good mark.

Kongo rock, of small extent and pyramidal in shape, has a depth of 3½ fathoms on it and 5 fathoms close around and 7 fathoms 50 yards off. It lies with Cape Palmas lighthouse bearing S. 86° E. (S. 66° E. mag.), distant 2,350 yards.

It is probable that this rock is that reported by the steamers *Congo* in 1875 and *Volta* in 1879, and which has been unsuccessfully searched for, although it lies further to the northward than the position given by either of those vessels.

Buoy.—A red can buoy is moored N. 55° W. (N. 35° W. mag.), distant 100 yards from this rock.

Anchorage.—The usual anchorage is on the west side of cape Palmas, in 6 or 7 fathoms, on a line between Rock Town point and the lighthouse with the latter bearing S. 68° E. (S. 48° E. mag.), distant 1,200 yards or farther out with the lighthouse bearing S. 88° E. (S. 68° E. mag.). Steamers sometimes anchor nearer the cape in 5 fathoms, but have been obliged to shift out, on rollers setting in.

Russwurm island.—On the south side of cape Palmas a small rocky island, nearly covered with grass and shrubs, and formerly used by the natives as a depository for their dead, has been named Russwurm island, after the first governor of the American colony of Harper. The island is nearly 600 yards in length, with an average breadth of about 70 yards, and a rocky pinnacle on it rises 43 feet above the sea. A ledge of rocks extends 200 yards from its eastern extreme, and terminates in a large rock above water; at ½ mile eastward of the island and nearly ¼ mile from the shore there are some breakers with 4½ fathoms close to their south side.

Three Foot rock.—At about 400 yards S. 66° W. (S. 86° W. mag.) of the western extremity of Russwurm island, there is a dangerous rock with only 3 feet water on it, named Three Foot rock.

Boat passage.—The channel which separates Russwurm island from cape Palmas affords a good passage to boats, provided they keep on the northern side of it.

Flat mountain.—Northeast of cape Palmas there is some elevated land, the highest part of which is named Flat mountain; it bears N. 4° W. (N. 16° E. mag.) of the cape, distant 25 miles, and is 1,095 feet high.

Soundings.—The 100-fathom edge of the bank of soundings approaches cape Palmas within 13 miles, the depth decreasing to 30 fathoms at a distance of 6 miles from the shore; and at 1½ miles from the cape the depth is 15 fathoms.

Tides.—It is high water, full and change, at cape Palmas at 4h. 30m.; springs rise 4 feet.

Current.—The general current along the Grain coast flows ESE. and SE., almost following the trend of the coast, with a rate varying from ½ to 2 knots an hour, but greatly influenced by the winds: thus, it has been established by numerous observations, that between Sierra Leone and cape Palmas, from May to October, the current flows NW., with winds from the south of SW., and flows easterly and ESE. with winds from the west of SW. In November it generally flows NW., and from December to May SE. It will be seen how important is a careful watch when near the coast. It is near cape Palmas, where it is narrowed in its limits by the Equatorial current, that the coast current is the most rapid. Beyond cape Palmas the current flows ENE., and is lost in the gulf of Guinea. During the rainy season, at the distance of a few miles from shore at cape Palmas, an easterly set of 3 knots an hour has been experienced.

Seasons and winds.—On the Grain coast there are two rainy seasons, the long and short ones. The former commences in April and finishes in mid August; in these months occur heavy tornadoes and abundant rains; July has uninterrupted rainstorms. Toward the middle of August the SW. breeze is irregular, though the prevailing one, and the weather improves until the end of September. In October and November, rains and squalls again occur, but only at intervals, followed by tornadoes until the middle of November; this is the second or short rainy season. The fine season commences with December, and alternating land and sea breezes are established, varying in force and direction. The land breeze is from NNW. to NNE. and lasts from midnight until noon, and the sea breeze from WSW. to WNW. The change from the sea to the land breeze is effected by a gradual hauling of the wind, by way of north in the middle of the season, and by way of south at the beginning or end of the season; there is sometimes a calm interval between the two. The sea breeze at the commencement and end of the dry season has a tendency to haul to the SW. The harmattan blows in December, but only at intervals, and without violence; it is no longer the cold and disagreeable wind as on the coast

to the northward; it is accompanied with fogs, commences at daybreak, and often ceases at noon.

Tornadoes.—Tornadoes occur on the Grain coast during the seasons already indicated, as well as storms. The most noticeable difference between a storm and a tornado is in the force of the wind, much less violent in the former than in the latter. The variations are the same, only tornadoes always commence from the eastward and storms are liable from any point, although generally from the eastward also. Storms slightly resemble abortive tornadoes.

When a tornado is undoubtedly recognized, it is prudent to take in all sail except the jib. Vessels bound to the westward need only allow themselves to be carried with the storm, whose route they follow for 6 to 10 hours. If bound to the gulf of Guinèa, they must clear themselves from the storm as soon as possible, and this can best be done by cutting it almost perpendicularly in running to the SW.

As a general rule, along the Grain coast, the weather during the rainy season is not so bad near the coast as it is 30 or 40 miles off shore. There is in this vicinity, at this season, a zone extending more or less to the northward, and more or less to the westward, in which calms, rains, and light and variable winds render navigation very difficult; whilst at 6 miles from the shore there are but short interruptions by rains and fewer calms than farther in the offing.

Fogs.—Fogs are frequent during the fine season, and so thick that it is oftentimes impossible to see ¼ mile. They ordinarily form just before daybreak, and lift about 8 or 9 o'clock in the morning, sometimes lasting all day. In the dry season the lands are never perfectly clear; in the rainy season, however, they most always are, and especially so after tornadoes.

These fogs are the source of large refractions, against which navigators must be on their guard in taking astronomical observations; they produce very singular optical effects, and sometimes the shore is made to appear much farther off than it really is.

Navigation.—Navigation on the Grain coast is not difficult for those vessels which are only passing, since the dangers are never more than 5 miles from the beach, and rarely more than 3 or 4. The lead, which has been so often advised, will in general suffice to point out these dangers. But for coasters, or vessels which communicate with the numerous villages, the coast is especially dangerous; consequently, when obliged to anchor evenings, they must maneuver with care, find a good anchorage, and then anchor at once, for five minutes may drift the ship over rocky bottoms.

Caution.—During the tornado season such anchorage should be selected as will permit easily getting under way in case of heavy squalls. On this coast ships can never feel sure that they are protected from tornadoes or

storms even in the fine season, when they are least frequent. It is always well to have a long scope of chain.

Krumen.—On all parts of the Grain coast when vessels are near the land they will be accosted by natives in their canoes, and can obtain excellent information from them that should not be neglected. All captains who propose touching at many ports should secure the services of one or more of these Krumen to assist them both on board and in boats or as pilots.

CHAPTER VII.

CAPE PALMAS TO CAPE THREE POINTS.

Ivory Coast.

Lagoon.—A narrow stagnant lagoon extends for 6 miles to the eastward of cape Palmas. It appears to be supplied by a small river, which, except in the rainy season, has not power to break through the sandy barrier that separates it from the sea. The position of this occasional outlet is marked by a depression of the beach; and on each side of it there is a native village, the inhabitants of which, it is said, sometimes empty the lagoon by an artificial channel, in order to take the fish.

Athol rock.—The beach eastward of cape Palmas is steep-to, with one or two conspicuous masses of stone upon it. A rock with 3 fathoms on it bears S. 68° E. (S. 48° E. mag.) of the lighthouse on the cape distant nearly 2 miles. In the same direction, but one mile farther off, there is a rock with 5 fathoms on it; and S. 63° E. (S. 43° E. mag.), distant 4¼ miles from the lighthouse, in the stream of 12 fathoms, lies Athol rock, its distance from the nearest shore being 2 miles. The depth on Athol rock is 3¼ fathoms.

Growa reefs.—The space between cape Palmas and Growa point, a distance of 7 miles, is full of rocky heads of too great a depth to bring a vessel up, except the three above described; a long series of reefs project nearly 2 miles to the southwestward from Growa point. The sea breaks violently on these reefs, which are steep-to, and toward which no vessel should approach at night nearer than 15 fathoms. There are two native villages near the point.

Cavally point.—At 1½ miles eastward of Growa, Cavally point forms the southern extremity of this part of Africa. The point, which may be distinguished from the adjacent sandy shore, by its black rocky appearance, is surrounded by reefs extending ½ mile to seaward. The village of Half Cavally stands on the point, and three other villages a little to the eastward.

Cavally rocks.—Eastward from Cavally point, distant 1½ miles, there is a large rock above water, which rises from a reef lying about ¼ mile from the beach; and at a mile further east there is another ledge about ½ mile from the shore, with another large rock above water upon it. Sunken reefs lie close along the coast abreast of this ledge, and between them there is a narrow channel, in which there is a depth of 5½ fathoms.

Cavally ledge.—Between Cavally point and Cavally river there is a

large and dangerous ledge, the southern extreme of which rises suddenly from the depth of 10 fathoms, and extends from thence toward the river. From that outer extreme Cavally point bears N. 83° W. (N. 63° W. mag.), distant about 2 miles, and the mouth of Cavally river N. 47° E. (N. 67° E. mag.), about the same distance.

Cavally river issues between two low and sandy points, 4 miles eastward of Cavally point; it has a bar at the entrance which is not always passable by boats. On the western entrance point there is a large native town, which may be recognized by its square church tower and several large trees; and on the eastern entrance point there is a group of tall palm trees. At a short distance seaward of the bar there are some detached rocks, with 4½ fathoms close to the southward.

Landing.—There is good landing inside the reef abreast the town, but the boat must be hauled up quickly to avoid being filled.

Cavally islet.—At about 3 miles eastward of Cavally river there is a small rocky islet ½ mile off shore, with a long reef extending from it in a SW. direction; from the west extreme of this reef to the beach the space is filled with a succession of breakers and ledges of rocks.

Anchorage.—There is anchorage in 7 fathoms, midway between Cavally point and Cavally ledge.

Owing to the rocky nature of the bottom, vessels are recommended not to anchor off this part of this coast in less than 10 or 11 fathoms.

Coast.—From Cavally islet to Tafu point, the coast trends 8 miles in an ENE. direction, the shore being formed by a sandy beach, off which lie a few rocks, and along which are several villages, conveying the idea of there being a numerous population. The interior appears to be one dense continuous forest, rising occasionally into clumps, either from undulations in the ground or from the character of the trees. Some of these clumps attain the height of nearly 200 feet above the sea.

Tabu river.—Tafu point is a small bold cliff, with 3 fathoms close to its base. There is (1889) a large conspicuous factory on the point. A small river named Tabu, after expanding into a lagoon, issues at 250 yards eastward of the point through a narrow channel not more than 55 yards in breadth. Between Willson point, the west entrance point, and Tafu point, a reef of sand and rocks, some of which are dry, extends to the southeastward; on the bar between this reef and William point, the east entrance point of Tabu river, there is a depth of 3 feet at low water. This shallow channel lies along the eastern shore, till a spit of sand which projects from Willson point, and is nearly awash, is rounded, and even then the water scarcely deepens for a mile within the entrance; nevertheless this little river is a convenient place for wooding and watering, being easy of access to ordinary boats, as the bar is generally smooth, and there is good anchorage in 7 fathoms within ¼ mile of its mouth. During the rainy

season it is said to be frequently impassable for even surf boats. There are several traders here and steamers call in occasionally by signals.

Water.—At the last of the ebb tide good fresh water may be obtained in any part of Tabu river; but it is more prudent to procure it about ½ mile within the entrance, abreast of a small detached sand bank where the boats may anchor in the middle of stream and fill their casks alongside.

Supplies.—To obtain wood it is necessary to obtain the consent of the neighboring chiefs, who style themselves respectively the River King and the Hill King. The former possesses two open towns at the entrance of the river, while the dominion of the latter is confined to a single village, but it stands on a rising ground about ½ mile to the eastward, and was well stockaded. Some small cattle, sheep, goats, and fowls, with bananas, sweet potatoes, cassada, pumpkins, and rice may be procured. Colored cloth and most manufactured articles bring their full value all along this coast; but above all other things, rifles, powder, and spirits are the great objects for which the natives contend.

Rocks.—Some rocks above water and sunken dangers lie eastward of William point, and also off James point the next to the eastward. Off the Hill King's village there is also a small reef; all these dangers have 2½ fathoms close to their southern edges. The most dangerous of them lies ¼ mile S. 26° E. (S. 6° E. mag.) of Hill King point; it carries but 3 feet water, with 3 fathoms close around it.

Tides.—It is high water, full and change, in Tabu river at 4h. 45m.; spring rise from 3 to 4 feet.

Tabu point.—From Tafu point the coast trends about NE. by E. for a distance of nearly 3 miles to Tabu point, which is low and foul; and S. 16° E. (S. 4° W. mag.) of it at ¾ mile distance there is a rock with 2½ fathoms on it, steep-to, with 9 fathoms outside it. Tabu point is double, with a village on each of its projections, and close round it to the northward is a river barred at the entrance, but open probably during the rainy season. A white factory with a red roof also marks the point.

Grand Tabu.—At one mile NE. of Tabu point there is a large native village named Grand Tabu, with an isolated reef in front of it, about ¼ mile from the shore.

Anchorage.—Vessels anchor off Grand Tabu for trading purposes; the natives are treacherous and should be guarded against.

Anchorage may be had at ½ mile S. 22° W. (S. 42° W. mag.) of Tabu point in 13½ fathoms, black mud; in a less depth the bottom is bad.

Basha point.—The bight between Tabu and Basha points, except at the above-mentioned reef, is clean, with regular soundings, and a sandy beach; Basha point is capped with rock, and the town upon it stands 50 feet above the sea.

A chain of reefs commences at ½ mile westward of the point, and continues for a distance of 1¾ miles to the northward. They extend more than ½ mile off shore, and lie in detached groups, steep-to on the outside, with a boat channel between them and the beach; this part of the coast should be approached with great care, as there is shoal ground (Penelope rock) 2 miles off shore, with Basha point bearing S. 80° W. (N. 80° W. mag.), distant 2 miles.

Basha point may be known by a large flat-topped tree at the town; and also by a grove, which stands about 344 feet above the sea, on a rising ground north, distant 5 miles from the point.

Du Enun hill, 15 miles distant in nearly the same direction, is likewise a conspicuous object.

Grand Basha river.—At about a mile eastward of Basha point is the entrance to Grand Basha river, which, like most of the rivers on this part of the coast, forms a junction with another stream just at the shore. There is a bar before it, and also two reefs a short distance outside the bar, with a narrow boat channel between them.

Wappu point.—From Grand Basha river a broad and nearly straight beach extends 3½ miles to Wappu point, a small rocky cliff on which a native town stands about 60 or 70 feet above the sea. It is quite safe to approach and bold on its southern face; but to the eastward there are some offlying rocks along the shore for the distance of a mile, none of which extend more than 300 yards from the coast. At Wappu there is a large tree similar to that at Basha; and at a distance of one mile N. 29° W. (N. 9° W. mag.) from the tree there is a grove the top of which is about 344 feet above the sea.

There is no permanent opening through the beach at Wappu, but a large body of water that accumulates there sometimes issues just to the westward of the cliff. This water is connected with a long and narrow lagoon, which lies close behind the beach, and reaches to the Poor river, a distance of 9 miles. The sandy barrier that separates this lagoon from the sea is covered with trees, but occasional bare spots show where the swelling waters burst through in the rainy season.

Poor point is on the western side of Poor river; it is low and rocky, and some rocks extend from it to the eastward about ¼ mile, in front of the entrance to the river, which is very narrow, but not entirely closed. These rocks, many of which are above water, are steep-to, having 4 fathoms close to them to seaward.

Coast.—From Poor river to the rocky bluff of Kadabu, the distance is 10 miles in a NE. direction. The coast between consists of a succession of sandy bights divided by rocky points, and the whole country appears a vast forest, rising gradually into dark wooded hills, one of which, named

Berebi coppice, lying N. 29° W. (N. 9° W. mag.), distant 2½ miles from Poor point, is 297 feet above the sea.

Round mountain, bearing N. 35° W. (N. 15° W. mag.), distant 11½ miles from Poor point, and Long mountain, bearing N. 16° W. (N. 4° E. mag.), distant 8 miles from the same point, are of moderate elevation, but afford good landmarks when in the offing.

At 3 miles NE. of Poor point commences an extensive line of reef lying parallel to the coast for a distance of 4½ miles, and terminating rather more than ½ mile SW. of Divile (Devil) rock. The average breadth of this chain of reefs is about a mile, and there is a safe passage for boats between it and the shore, with regular soundings from 1½ to 4½ fathoms. This whole chain is steep-to on the outer side, there being 6 fathoms within a few yards of it, and farther out there are no dangers, the soundings decreasing regularly from a depth of 30 fathoms, which is found at 5 miles in the offing.

Half Berebi.—The native town of Half Berebi stands upon the second point east of Poor river; the numerous villages near the shore appear to be thickly peopled, but traders should guard against the treachery of the natives.

Divile (Devil) rock is a large oval rock, rising 45 feet above the sea; the base is dark, but the numerous sea fowl of which it is the constant resort, have blanched its flat summit. It lies nearly 2½ miles S. 47° W. (S. 67° W. mag.) of Kadabu bluff, and ⅔ mile from the nearest shore. On the bearing of N. 47° E. (N. 67° E. mag.) from it, distant ½ mile, there is a sunken rock, upon which the sea breaks. These rocks are both steep-to on the south side, having 6 fathoms close to them, and there is a channel of 4 to 5½ fathoms in depth between them and the shore. The depths between Divile rock and Rock Town point, west from it, range from 4½ to 5¼ fathoms over a sandy bottom.

Kadabu bluff is a bold rocky point, the SE. extreme of which is cleared of trees, and the bare summit, on which stands the native town of Yeh, is 120 feet above the level of the sea.

Grand Berebi.—From Kadabu bluff, the shore makes a sudden turn to the northward for about a mile to the mouth of Nano river; and on a rising ground in the space between stands Grand Berebi town, abreast of which and ¼ mile off shore there are some rocks named Gumara reef, with a boat channel between them and the beach.

Nano river.—This river pours out a small volume of water, but its sheltered position enables it to wash away the bar at its entrance so as to be always open for boats; there are some rocks immediately off its mouth, with 2 fathoms inside them. There are several hills by which this place may be recognized from the offing; two standing together named the Kadabu hills lie 3 miles WNW. of Kadabu bluff; Akol, a sharp pointed hill, is

NNE., distant 5 miles from the bluff; and at a distance of 16 miles in the same direction the Oval mountain rises 1,315 feet above the sea. When near the shore the place may be known by the sudden receding of the coast line and the peculiar form of Kadabu bluff, as well as by Katum rock, a large white rock, which lies 1¼ miles N. 48° E. (N. 68° E. mag.) from Kadabu bluff. The river is also known as Berebi and the Poor.

Tahu point.—From Grand Berebi a long sandy beach trending about E. by N. extends 13 miles to Tahu point, which is rocky and steep-to, with 4 fathoms close to it. The numerous native settlements along this part of the shore are named generally the villages of Tahu. The coast is thickly wooded and of moderate elevation, the tops of the highest trees near Tahu point being 290 feet above the sea.

Eastward of Tahu point the shore changes its character, isolated and irregular hills rising immediately over the beach.

Rocks.—In this extent of coast there are many rocks, both above and under water; the first group is situated 1½ miles eastward of the large white rock of Katum; it is about 2 miles in length, and extends ¾ mile from the shore. At 5¾ miles eastward of Katum rock and 1¼ miles from the shore, there is a large white rock with 9 fathoms round it, to which the natives have given the name of Bruni, or White man; some breakers lie rather more than ½ mile SW. of Bruni rock, in the stream of 10 fathoms; and abreast of it, near the shore, there is a group of rocks above water, with a channel of 3½ fathoms between them and the beach.

A rocky ledge, with 5½ fathoms on it, lies N. 75° E. (S. 85° E. mag.), distant 2 miles from Bruni rock, in the stream of 10 fathoms; midway between that ledge and Tahu point, and at about ½ mile from the beach, there is a sunken rock, inside of which there is a channel of 5 fathoms; at a mile farther to the eastward there is another shoal, nearly in the meridian of a high grove of trees; and just westward of Tahu point a series of rocks commences which nearly surrounds the point, and in one place extend from it nearly a mile. Some of them are large masses of dark stone above water, and a narrow channel may be found through them with 3½ fathoms water in it. All these rocks are steep-to on the southern side.

San Pedro river, 3 miles eastward of Tahu point, appears to be a large sheet of water with a small islet in its center, but the entrance is entirely barred by a broad bank of sand.

San Pedro point, surmounted by hills 350 feet high, is on the east side of San Pedrō river.

San Pedro rock, not specially named on chart, is said to be 16 feet high. It is probably the rock shown in (approximately) latitude 4° 43′ N. longitude 6° 37′ W.

Wreck.—The S. S. *Soudan* struck and subsequently foundered on a danger, said to be about ½ mile S. 59° E. (S. 39° E. mag.) from the rock known as San Pedro. The wreck lies in 56 feet water, 1½ miles S. 68° E. (S. 48° E. mag.) of Tahu point (1892).

Highland river is a fine open stream issuing from behind Highland point, 6 miles from Tahu point, and into which the surveying boats easily entered by a channel carrying 6 feet at low water.

The tidal streams in Highland river are very rapid.

San Pedro shoals.—From Tahu point to Highland point the shore is fringed by a succession of rocks and breakers, named the shoals of San Pedro; they are all steep-to on the outer face, do not project more than ½ mile from the coast, and leave a safe 3-fathom channel for boats between them and the beach.

Highland point, which by its shelter leaves the bar of Highland river generally passable, is a bold rocky peninsula, but has some rocks extending a short distance off it; it forms the south entrance point of Highland river. A rocky hill 355 feet high rises immediately inland from the isthmus, which connects Highland point to the main. A small river lies to the westward of the point.

Drewin point lies 11 miles northeastward of Highland river, and in the space between there are a few indentations in the coast, and but two dangers. A short reef lies about a mile westward of Ensu point, which is midway between San Pedro river and Little Drewin; and Temple rocks are 3½ miles eastward of that point. The latter lie about ¼ mile from the coast in front of a village, with a clear 3-fathom channel between them and the shore. The approach from the offing is everywhere safe, with regular soundings. The land here gradually attains a little higher elevation, and is more diversified with hill and dale than the coast to the westward. The hill named East Tree is 400 feet above the sea; Temple hill, 517 feet; and the whole range, which extends 27 miles along the coast to St. Andrew river, has received the name of the Highland of Drewin.

Little Drewin (Victoria.)—On the north side of Drewin point there is a small bay, with the two villages of Little Drewin at the base of the hills. The Krumen name the inhabitants "The Saucy Drewins," from their rough and noisy habits.

Abrapa cliffs.—From this bay a succession of small rocky points, with slightly receding sandy beaches between them, extends in a straight line ENE., for a distance of 6 miles to the white cliffs of Abrapa, off which there are a few rocks. In the space between, there are also three small streams, but all barred across their mouths.

Enframa point.—From Abrapa cliffs to Enframa point, a distance of 7 miles in an easterly direction, the coast continues of a similar character. Several rocks show themselves by breakers, but they are generally very

near the shore, and all have 6 fathoms close to. The most prominent of these lies 3 miles eastward of Abrapa point, and nearly ½ mile off shore, with a 4-fathom channel between it and the coast. There is a conspicuous white cliff, with some reefs at its base, nearly halfway between Abrapa and Enframa points, off which latter a reef extends about ¼ mile.

Kassi point lies 4 miles eastward of Enframa point; in the bay between there is a small river barred in the dry season, and to the eastward of the river a large village named Grand Drewin.

Grand Drewin.—From Kassi point to Swarton corner, a distance of 7 miles in an NE. by E. direction, the coast still retains its character of sandy bays and rocky points, fronted by small reefs, and with elevated land in the interior intersected by valleys. The town of Grand Drewin lies 1½ miles eastward of Kassi point, and off the town there is a detached rock, about ½ mile from the shore. Midway between this rock and Swarton corner there is a reef with two breaking shoals outside of it, lying a mile from the shore; from thence to Swarton corner the coast is clear of all danger.

Swarton corner is a bold headland, 208 feet above the sea, forming the eastern extremity of the Highland of Drewin; some fragments of rocks are scattered round its base, but there are 5 fathoms close to them.

Sassandra, or St. Andrew, river.—King George town stands on the shore about ½ mile north of Swarton corner, and at the head of the little sandy bay eastward of that headland, the rivers Sassandra, or St. Andrew, and Tabeta pour their united waters into the sea. The two long sandy spits, between which lies the opening, are probably submerged during the rainy season; and then a large rock 8 feet high, which stands on the extremity of the western spit, will appear like an islet in the middle of the entrance. On the bar which extended across this opening the surf was so heavy that no boats could enter, and therefore the depth of the spacious sheet of water inside is imperfectly known, but a few soundings obtained from a canoe showed that in parts of it there were from 5 to 7 fathoms. Besides the rivers above mentioned there are two smaller streams which fall into the bay, the Beyh and the Gapeh; and opposite the mouth of the latter there is a small island named by the natives Nuckba.

Sassandra hills.—On the bearing of N. 54° W. (N. 34° W. mag.) from Swarton corner there is some elevated land, at 5 or 6 miles distant; and there is a range of still higher ground, named the hills of Sassandra, the extremes of which bear from N. 51° W. (N. 31° W. mag.) to N. 9° W. (N. 11° E. mag.) from Swarton corner, distant 15 miles. The highest part of this range is 930 feet above the sea.

Anchorage.—Trading vessels anchor off St. Andrew river, and with the aid of a native pilot the river can be entered in boats.

Soundings.—The bank of soundings to the 100-fathom line extends 18 miles south from Swarton corner, the 30-fathom line approaching to within 10 miles.

Price point.—Eastward of St. Andrew river a flat coast and sandy beach extends for 3¼ miles to Price point, at which hills again rise, those immediately about the point attaining an elevation of 276 feet.

This sandy beach is steep-to and quite clear of rocks; but Price point and Trepau point, 1¼ miles farther east, are both rocky, and have a few offlying rocks at their bases; there are two small bays between these points, and at the base of the hills near the shore there are numerous villages. The soundings decrease more slowly in approaching the shore here than to the westward of St. Andrew river, and the bottom is everywhere of mud.

Mortality point, lying 2 miles eastward of Trepau point, projects but little from the line of coast; it is bold and without any detached rocks. The vicinity is populous.

Mount Langdon.—From Mortality point to mount Langdon, a distance of 5½ miles, the shore continues high and broken by ravines, through which run large streams. A few rocks lie near the shore in this space; the bank of soundings off the coast is rather flat, there being 3 fathoms close in, and only 7 fathoms at 1¼ miles in the offing. Mount Langdon is 355 feet above the sea; a short reef extends about ¼ mile from its base, and on either side there is a barred-up river. The beach is sandy, with occasional bare patches of rock upon it.

Yawoda cliff.—At Yawoda, 3 miles eastward of mount Langdon, a series of red cliffs begins and extends to Fresco river, a distance of nearly 15 miles. From Yawoda to the red cliffs of Kutru the coast is nearly straight for a distance of 4 miles; the land continues high, much broken, and to all appearance thinly peopled. The beach is sandy and entirely clear of rocks; at Kutru the cliffs are about 150 feet above the sea, while the tops of the trees on the adjacent hills rise to a height of 264 feet.

Mount Bedford.—The coast continues nearly straight for 9 miles in an E. by N. direction from Kutru to mount Bedford, which stands over the largest and most remarkable of the red cliffs, at an elevation of 238 feet above the sea; the shore is generally a sandy beach, though under some of the cliffs the beach disappears, and large stones, apparently débris from the falling of the cliffs, form the coast line. Throughout this space the shore is fronted by rocks, which extend ¼ mile from it; but a vessel may stand into 5 fathoms without danger, and in that depth will generally be about ½ mile from the beach.

Fresco river.—The red cliff at mount Bedford is 1½ miles in length, and its eastern extremity descends gradually to Fresco river. The mouths of this river are barred in the dry season, but the natives state that they

open in May. The delta extends 1½ miles from west to east, and is divided into several wooded islets. On the sandy point to the eastward of the river stands a large native town named Fresco; and the main body of water is evidently discharged at that point. A range of high land named the hills of Fresco, are situated 5 or 6 miles NNE. of the town.

Coast.—The coast between Fresco river and the river of Grand Lahu, for a distance of 35 miles in an easterly direction, is low, well wooded, and thinly inhabited. The beach is everywhere a clean, light-brown sand, free from offlying rocks; it is nearly straight, and the surf on it is always very high. Within this beach there is a narrow strip of stagnant water, which lies parallel to the coast throughout the whole distance between the two rivers, and in a few places appears to receive some small streams from the interior. Native villages are built at intervals upon the narrow belt of land between this backwater and the ocean. They are generally surrounded by groves of cocoanut trees.

Soundings.—The soundings along this whole extent of coast are regular, there being a depth of 3 fathoms close outside the surf, deepening gradually to 10 fathoms at a mile from the beach. Near the coast the bottom is generally sandy, changing gradually to mud, which is found in the offing.

Piccaninny Lahu.—This town is 14 miles eastward of Fresco river. Some rising ground behind it is known as the Kakraba, or Small hills.

Half Lahu lies 15 miles east of Piccaninny Lahu and Grand Lahu (Salt town) 2 miles further in the same direction, or within 4 miles of Grand Lahu river.

Grand Lahu.—The town of Grand Lahu has been shifted and is now about 2 miles to the westward of the entrance of the river of the same name, in the position of Salt town. This entrance is very narrow, with a dangerous bar across it, on which the sea breaks with so much violence that it is not passable by ordinary boats, and even the native canoes are frequently upset upon it. Both points of the river are low and sandy; the western entrance point is covered with cocoanut trees, under which the town is built; on the eastern point there is another smaller town, but no trees.

Mount Lahu, a short range of hills 350 feet high and covered with large trees, stands about 6 miles north of the entrance to Lahu river.

Long hills.—At about 5 miles northeastward of mount Lahu the Long hills commence; they lie parallel to the coast for 11 miles, and are of about the same height as mount Lahu.

Tides.—It is high water, full and change, at Grand Lahu at 4h. 20m.; springs rise 4 feet.

Coast.—From Grand Lahu a high sandy beach continues in a straight line for a distance of 60 miles to Piccaninny Bassam; and a narrow lagoon or backwater extends the whole distance, at an average distance of about

2½ miles from the shore. The land is everywhere low without any remarkable object upon it; and the ridge of sand between the lagoon and the sea, being thickly wooded, presents the same uniform appearance throughout, varied only by the numerous villages upon it, round each of which there is a grove of cocoanut trees. The beach is everywhere steep-to, 3½ and 4 fathoms being found as close to the surf as it is prudent to venture. Off Grand Lahu there are 10 fathoms at a mile from the shore; off Jack Jack the same depth at ¾ mile, and off Piccaninny Bassam there are 17 fathoms close to the beach. The tops of the trees in the foreground are from 120 to 140 feet above the sea, but near Jack Jack they rise to a height of 190 feet.

Amokwa, or Half Jack.—This town, apparently of considerable size, lies 34 miles eastward of Grand Lahu. The marks for recognizing this place are a white house with a flagstaff, and a little eastward of it three large factories, with two flagstaffs, on the beach. Good water can be obtained here in large quantities. A large trade is carried on in palm oil and cocoanuts. At times there are from 8 to 10 vessels anchored here.

The natives on the coast between Half Jack and Grand Lahu are said to be very troublesome.

Afugu, or Ivory town, is a native village 39 miles eastward of Grand Lahu, off which trading vessels anchor, and which is the best place at which to obtain water between St. Andrew river and Axim.

Piccaninny Bassam is a native village built on a narrow strip of sand, about 500 yards wide, which separates the lagoon from the sea.

Bottomless pit.—Near Piccaninny Bassam, in longitude 3° 57′ W., is an extraordinary feature of this coast, known as the Bottomless pit. The great bank of soundings which fronts the west coast of Africa, and which extends to various distances from the shore, and therefore falls with various degrees of declivity, but even when steepest, generally preserves a regular descent, is at this point divided into two parts by a narrow ravine or gully of very great depth. East and west of this place the 100-fathom line is approximately 14 or 15 miles from the land, but here it turns in gradually toward the coast in a funnel shape. At 8 miles off shore the two lines of 100 fathoms are 3 miles apart, with as much as 400 fathoms between them; at 3 miles from the coast they approach each other within less than a mile, with a depth of 256 fathoms in the channel between. At a mile from the shore the gully is scarcely ¼ mile wide; at ⅓ mile there is still a depth of 100 fathoms; and finally, at the head of this singular submarine valley, there are 20 fathoms water at the very edge of the beach. The bottom is generally a soft bluish mud, but at the depths of 190 and 220 fathoms some coral rock was brought up by the lead.

The land continues very low for some distance inshore, with two ranges of hills to the eastward and westward.

There were no eddies nor ebullition observed in the sea, and while at

anchor in 18 fathoms, ¾ mile off the eastern village of Piccaninny Bassam, no tidal stream was experienced, nor any discoloration of the water observed.

Ordinary boats could not effect a landing, and the natives were several times upset in bringing off supplies.

Grand Bassam.—From Piccaninny Bassam the coast trends E. by S. for a distance of 15 miles to the mouth of the Grand Bassam river, on the western side of which at 5 miles within the entrance, are the villages of Grand Bassam. This place is easily recognized by two large factories on the beach, the west one hoists a white flag with a red cross and the east the French flag. Several small French gunboats are stationed here. The constant discharge from the Grand Bassam (Costa) river discolors the sea for a distance of 4 or 5 miles from the shore.

The bar.—The entrance to the river is between two low sandy points, on the eastern of which there is a clump of trees; it is very narrow and there is a heavy surf upon the bar, which carries a depth of 12 feet at high water springs; during the best season the bar is practicable for vessels drawing 10 feet. Before entering, the bar should be sounded and buoyed with marks also inshore. Long vessels can not enter, as there is a sharp turn after passing the breakers and the river is very rapid. The bar is generally passable for about two-thirds of the year.

Pilots and signals.—There are no pilots nor any bar signals.

Telegraph.—There is communication with Accra. The cable buoy lies S.16° E.(S.3° W.mag.) of the French factory in 10½ fathoms.

Communication.—The English mail steamer calls twice a month in going to Lagos, and twice when returning to Liverpool.

Anchorage in from 8 to 10 fathoms WSW. of the bar, from S. 17° W. (S. 36° W. mag.) to S. 40° W. (S. 59° W. mag.) of the French factory.

Wreck.—The three-masted vessel *Sainte Antoine* lies sunk in a depth of about 7 fathoms, with the masts showing about 12 feet above water, in the anchorage at Grand Bassam. From the wreck the French factory on the east side of the entrance bears N. 50° E. (N. 69° E. mag.), distant one mile. Approximate position, latitude 5° 10¼′ N., longitude 3° 42¼′ W.

Lagoons.—An extensive chain of inland lagoons is situated between Lahu and Assini rivers; their only outlet is through Grand Bassam (Costa) river. The shores of these lagoons are densely peopled, and there is a considerable trade in palm oil.

Three streams pour their waters into these lagoons, the principal being the Akba, or Komoë.

Numerous trading posts are established round the shores of these inland waters, and several small steamers ply on them for trading purposes.

Vessels should trade under the French flag.

Akba, or Komoë, river.—At about 3 miles north of the French factories at Grand Bassam this river joins the lagoon on the eastern side. The course of Komoë river has not been explored beyond about 30 miles from its mouth, but it is said to come from a long distance in the interior.

Between April and June the river rises about 15 or 20 feet.

At Alepé, 20 miles above the mouth of the river, are rapids which are, however, passable by small steamers.

Komoë river is connected on its eastern side with two shallow lagoons, known as Ono and Kodiobuē lagoons, which latter extends almost to Assini river.

The downward current of Komoë river is very rapid and dangerous to small vessels lying at the anchorage north of the French factory at Grand Bassam river.

Potu lagoon, extending northward for about 12 miles from Grand Bassam, is narrow and shoal, but navigable for small steamers.

Grand Bassam lagoon extends about 65 miles west of Grand Bassam, at an average distance from the coast of about 2½ miles; its western part is only 3 miles from Lahu river.

The lagoon contains many small islands, and the shores are much indented and densely populated.

At Dabu, on the northern side, about 40 miles west of Grand Bassam, the fortified French post is no longer occupied and is going to ruins.

At about 4 miles east of Dabu the lagoon receives the waters of Aébi river, which flows into it from a northerly direction; this river, the Komoë, and a stream at the head of the lagoon, are the only three which are known to communicate with it.

Grand Bassam lagoon is navigable only for vessels drawing 6 feet; an extensive shoal, on which that depth is found, lies about 8 or 10 miles east of Dabu.

Assini river.—This river, the bar of which is frequently impassable, even for canoes, except during the harmattan season, lies 19 miles east of Grand Bassam river; the intermediate beach is nearly straight, with several villages upon it. The coast is free from offlying rocks, and the soundings are regular up to the depths of 5 fathoms, which is found close to the surf, that commonly runs so high as to render landing impracticable. Near the shore the bottom is generally of fine dark sand, but outside of the depth of 10 fathoms a dark olive mud.

The entrance to this river can only be distinguished from seaward, by the surf breaking further off shore than it does in the vicinity. Also, by the large trunks of trees near the mouth, as there is no brushwood. There are three factories near the mouth of the river; one, a French factory, is red and on the site of an old bastion.

In very fine weather small steamers drawing 4 feet can cross the bar. There are no pilots.

A large village is close west of the entrance to Assini river, and at 1½ miles east of the entrance is the French Representative's house.

Lagoons.—An extensive sheet of water, covering a space of about 35 miles east and west, by 20 miles north and south, communicates with Assini river; the various divisions of these inland waters are known as Abi, Tando, or Tano, and Ehi lagoons.

Several streams flow into these lagoons, the principal being the Tando, or Tano, which enters Ehi lagoon from a northerly direction. The Tando and Ehi lagoons, with the Tando river, are free and open to the boats and inhabitants of the French and English protectorates.

Sueiro da Costa hills, which lie to the westward of Assini river, and 6 or 7 miles inland, rise toward the northeastward where Church mount is 540 feet above the sea.

Assini.—This town lies about 8½ miles eastward of the entrance to Assini river, and consists of several European buildings, with a native village close west of them. The mails are carried overland to Grand Bassam.

Newtown.—At 9 miles eastward of Assini is the English settlement of Newtown, where there are some tall palm trees. The French frontier is ½ mile west of Newtown.

Half Assini, or Ewiano, a village with about 1,000 inhabitants, lies 32 miles eastward of Assini river.

Albani river.—From Assini river a sandy beach extends E. by S. for a distance of 38 miles, and nearly in a straight line to Albani river. Between these two rivers a narrow lagoon extends parallel to the beach at a distance of about a mile from it, and appears to have forced through the sandy beach four communications with the sea, which are not connected with any corresponding streams from the interior. The opening of the river is distinguished by tall trees.

Assini hills.—There is an undulating range of high land along this coast, which may be divided into the Assini, Albani, and the Apollonia hills. The western extremity of the former is known as the "Grotto," and stands about 470 feet above the sea.

Albani hills.—The western extremity of Albani hills is 340 feet high. but they rise a little toward the eastern part of the ridge, where it overhangs Albani river.

Apollonia hummocks.—To the eastward of Albani river are situated the four hills, or hummocks, of Apollonia, or, as they are usually named, cape Apollonia; for, lying at an angle of inclination with the coast, and terminating upon the beach, with an extensive level plain to the eastward, they present, when seen from a distance, all the appearance of a long pro-

jecting point. The highest of these hummocks is about 284 feet above the sea.

Between Assini river and Apollonia the whole country is covered with a dense forest, and apparently but thinly peopled to the westward of Albani, but from that town to Apollonia the coast is studded with villages.

Coast.—From the hummocks of Apollonia to Ankobra river, a distance of 23 miles, the land presents the appearance of an extensive plain, covered with forest. A high sandy beach, nearly straight, forms the coast line, and at a few yards from the shore, in the midst of palm groves, are situated many native villages. The soundings are everywhere regular, with no rocks or shoals, and the quality of the bottom is fine dark sand near the shore, with dark olive-colored mud in the offing.

Apollonia fort.—This fort (which is the first seen eastward of Sierra Leone) stands on the beach about 4 miles east from Apollonia hummocks. It was originally one of those strong trading houses where goods were deposited, and where the merchants resided, but which, from the attacks of rival traders, native robbers, and sea pirates, were gradually converted into military defenses; it is now in ruins.

Ebomesu river.—A straight and safe coast extends for 12 miles from fort Apollonia to Ebomesu river, the entrance of which is very narrow, with a high surf breaking across it. The river is navigable for surf boats and small steam launches for about 13 miles in a northwesterly direction to Lake villages.

Ankobra river.—This straight sandy beach extends only 7 miles east of Ebomesu river, Ankobra river there dividing it from the group of hills and rough ground which form cape Three Points, and the whole aspect of the coast is at once changed. The river flows into the sea 2 miles NW. of Axim. It is from 80 to 100 yards wide from its mouth to Akanko, and about the month of June, when the river is at its highest, carries 3½ to 4½ fathoms, but it again becomes low in September. Boats are taken up to Tomento, about 50 miles from the mouth, whence there is communication by land with the Wassaw gold mines. At Tomento, the river ranges about 25 feet between its high and low state, and tidal influence extends 8 miles up from its mouth.

Bar.—There is a depth of 6 feet upon the bar, with hard bottom which does not change much, and the rise of the tide is 3 feet.

Akrumasi point, which forms the east side of the entrance to Ankobra river, has a ridge of black rocks and loose stones extending S. 4° W. (S. 22° W. mag.) from it about ¼ mile; at ½ mile S. 34° W. (S. 52° W. mag.) of the point there is a detached ledge of rocks (Akrumasi ledge), some above and others under water, with a channel of 3½ fathoms between them and Akrumasi point; and S. 82° W. (N. 80° W. mag.), distant one mile from the same point, there is a solitary breaker.

Axim bay.—From Akrumasi point to Pepré point (a low point with a few trees upon it), the distance is 2½ miles in a SE. by S. direction, and the coast between recedes into what is usually known as Axim bay, the fort of St. Anthony standing about a mile northward of Pepré point; it is situated on a low rocky point, with a sandy bay and native town on either side, and some rocky ledges in front. The top of the highest building is 75 feet above the sea, and the hills about ⅜ mile to the eastward are 300 feet high. The landing here is safe, being protected from the heavy swell by the rocky ledges and islets which lie in the vicinity.

Saiaba island.—This island, 45 feet in height, lies 1,800 yards N. 53° W. (N. 35° W. mag.) of Axim fort, and ½ mile from Ronda point, with which it is partly connected by a chain of rocks, between which there are deep passages for boats, a large flat rock, nearly awash, lies 100 yards SW. of Saiaba island. A ledge of rocks projects from Kebrada point, at ¼ mile north of the fort, for a distance of about 200 yards, and two large groups of rocks which lie immediately in front of the fort afford protection and shelter to the adjacent beach. Giba and Bobowasi islands are SW. of the fort, and between them and the shore, as far as Pepré point the space is nearly filled by rocks and ledges; Bobowasi island had a clump of palm trees on its summit. These islets and ledges are all steep-to on the western side, having 4 fathoms close to them.

Water may be purchased at Axim in small quantities. The watering place is a well behind the fort, but the water is not of good quality.

Tides.—It is high water, full and change, in Axim bay at 4h. 30m.; springs rise 4 feet.

Hoeven rock, a rocky head of about 10 yards in extent, with 9 feet least water, lies with the following bearings and distance: Akrumasi point, N. 9° W. (N. 9° E. mag.), fort St. Anthony, N. 79° E. (S. 83° E. mag.), distant 1 3/16 miles, and Pepré point, S. 63° E. (S. 45° E. mag.).

Foul ground with depths of 4 to 5½ fathoms was found to extend from the rock for the distance of 100 yards in all directions.

Buoy.—A conical black-and-white checkered buoy, with staff and cage, has been placed in 6¼ fathoms, 100 yards S. 41° W. (S. 59° W. mag.) of Hoeven rock. Not to be depended upon.

Anchorage.—To avoid Hoeven rock, bring St. Anthony fort to the northward of N. 60° E. (N. 78° E. mag.), when a vessel may anchor in safety in 6 fathoms.

A good berth is found with Saiaba island summit bearing N. 4° E. (N. 22° E. mag.) and St. Anthony fort bearing N. 49° E. (N. 67° E. mag.).

Soundings.—The change in the character of the coast, which occurs east of Ankobra river, makes none in the regularity of the soundings, the bank to the 100-fathom line off Axim bay being about 20 miles in breadth, and

the bottom of fine sand, the depths diminishing gradually from 100 fathoms to 3 or 4 fathoms near the surf.

Peninsula point.—From Pepré point to a point known as the Peninsula, the distance is 6 miles in a SE. direction, the space between being divided into several bays by rocky points, all safe to approach within a distance of ¼ mile. The ground about midway between Pepré point and the peninsula rises to a small hill named mount Terceira, which is 300 feet high. The Peninsula appears like a low island when seen from the westward, and there is a remarkable single tree a little inshore of it.

Brandenburg fort.—Eastward of peninsula point, a long straight beach is interrupted by a projecting rock, on which stands the ruin of fort Brandenburg, at the height of 115 feet; and which, being overgrown with dark trees and shrubs, is the more conspicuous from its contrast with the white sandy shore on either side. Westward of the fort there is a small river which is said to flow from amongst the hills to the northward, and which passes behind the fort to a second outlet at Sekan point, a low rocky ridge near the eastern extremity of the beach. There the land rises rapidly to the highest hill in the vicinity of cape Three Points, which has been named mount Heathfield, elevated 445 feet above the sea. Viewed from the westward, it appears as a bold bluff.

West point.—The shore from Sekan point turns to the southward toward Frederick and West points, which latter is a rocky bluff, with some rocks at its base, forming the southern extremity of Brandenburg bay, as well as the western extremity of the projection known as cape Three Points.

Winds and weather.—On the coast between Sierra Leone and cape Three Points the rainy season commences in May and lasts until September, with generally a partial break about the middle of August. During this period of the year fresh WSW. winds are experienced, accompanied by a heavy swell.

Tornadoes are encountered in April, May, and October.

The harmattan season begins in December and continues during January and February; when this wind is not blowing, southerly and westerly winds prevail, accompanied by fine weather.

CHAPTER VIII.

CAPE THREE POINTS TO CAPE ST. PAUL.

Gold Coast.

Gold Coast colony.—The principal British possessions included in this colony are Newtown, Axim, Dix cove, Elmina, Sekondi, Cape Coast Castle, Accra, Adda, Kitta, and Lagos. The colony and protectorate have a population of 1,462,000.

Climate.—The climate of the Gold coast is damp, hot, malarious, and unhealthy for the continued residence of Europeans who suffer from coast fevers, and at times dysentery, although yellow fever is unknown. The range of temperature is from 68° to 87°, the mean being 82°. The rainy seasons are from March to July and September and October. From November to February is the cool dry season.

Cape Three Points projects from the mainland in the southwesterly direction about ½ mile, with a large rock lying 100 yards off its pitch known as the Boidan.

When seen from the eastward or westward the cape appears as two hills, on the southern of which is the lighthouse. Cape tree on the northern hill can no longer be singled out.

Light.—From a white lighthouse, 20 feet high, erected on cape Three Points, is exhibited from an elevation of 75 feet a fixed white light. The light is visible in clear weather from a distance of 13 miles, and may generally be depended upon.

Boidan rock is 20 feet high, and remarkable when seen from either the westward or eastward; it is steep-to, having 5 fathoms close to the surf, which breaks around it.

Between Boidan rock and the shore are some rocks above water, and others which are covered.

Cape shoals.—At ¼ mile off cape Three Points, between the bearings of S. 61° W. (S. 79° W. mag.) and S. 16° W. (S. 34° W. mag.) there are some dangerous rocks named Cape shoals. The least water found on them was 2½ and 3 fathoms, but the soundings all round are very irregular, and the bottom everywhere of rock, the shallow portions of the shoals appearing to be large detached masses with deep intervening fissures. The lead is a bad guide to clear them, as to the westward there is little more than 200 yards from a depth of 11 to 3 fathoms, and to the southward from 14 fathoms to that depth. These shoals are the more dangerous as the sea does not always break on them, and even when heavy rollers break in

succession there is occasionally a considerable interval of time before others of sufficient volume come up.

Marks.—East point in line with Akwida point, bearing N. 61° E. (N. 79° E. mag.) leads southward; and West point, in line with the sandy beach east of Frederick point, bearing north (N. 18° E. mag.), leads westward of Cape shoals; at night no vessel should approach them on the western or southern sides nearer than 19 fathoms.

Current.—The current is very variable both in strength and direction near cape Three Points. Close south of the cape a current setting to the eastward at the rate of 3 knots an hour, has been met with. Again, a strong current setting inshore has been experienced when passing the cape.

Inner channel.—There is a channel ½ mile in breadth between cape Three Points and Cape shoals, but the ground is very uneven, with some rocky heads carrying only 4 and 4½ fathoms. Few vessels can have any object in using this channel, but when necessary perhaps the safest course to adopt will be to keep close to Boidan rock, as 5 fathoms will be found there. The shoal water seems to lie in the form of a ridge from thence to the outer shoals.

Tides.—It is high water, full and change, at cape Three Points at 4h.; springs rise 4 feet.

River point.—At 600 yards NNE. of cape Three Points there is a small rivulet with a rock in the middle of the entrance, and a rocky hillock on its eastern side known as River point; and at ½ mile farther eastward there is another outlet to the same stream. Two rocky flats extend here from the beach, on the eastern of which stands a tall stone like a ninepin.

Anama point lies 1½ miles from cape Three Points; it is quite safe of approach, for most of the rocks which lie round it are visible, and have 7 fathoms water close to them.

East point.—A rocky bay, near a mile across the mouth, with a couple of small islets in it, lies between Anama point and East point. East point, forming a high salient headland, is steep-to, having 4 or 5 fathoms close to on all sides. A large tree on the elevated ground above the point, has a remarkable appearance when viewed at a little distance on either side, and distinguishes it from any of the adjacent points. The whole extent of cape Three Points, that is to say, the space from West Point to East point, is a series of hills with abrupt sides and rocky points, but without dangers that are not visible at all times, the cape shoals excepted. In the offing the bottom is generally of soft blue mud, though with some sandy and rocky spots.

Coast.—From East point the coast continues of the same character for ¾ mile; the higher lands then recede from it, leaving an undulating country of less elevation between them and the coast, and the shore forms a sandy bay as far as Stephens point, a rocky knoll at the western side of

Akwida cove. The eastern side of this cove is a small peninsula, crowned by the ruins of Akwida fort.

Akwida cove is divided into two little sandy bays, the western of which is obstructed by rocks, but the other affords tolerably good landing on the beach at high water. In the rainy season there is a small stream named the Alligator, with its outlet close to the point which separates the bays.

The entrance of the cove is not more than 300 yards wide, with 3½ fathoms in mid-channel, on a sandy bottom, but shoaling rapidly to the beach. From each of the outer points, rocks extend to the SW. about 300 yards.

Achowa point.—From Akwida point a sandy beach 3 miles in length trends about east, terminating at Achowa, a broad point consisting of several rocky projections. Some large rocks above water lie off this point, which may be distinctly seen from cape Three Points; and off each of its angles there is a short reef. On the high ground above its western hill there is a grove of trees, the tops of which are 220 feet above the sea, and which show well when approaching the point, particularly from the westward.

Soundings.—The soundings between East and Achowa points are very irregular between the shore and the depth of 13 fathoms, within which strangers would do well not to approach. That space contains also some rocks near the shore, which are to be seen above water, with channels of 4 fathoms inside of them; while others lie farther out, and carry but 3 feet water, giving little or no warning of approach by the lead.

East rock, on which the depth is 3 feet, lies S. 23° W. (S. 41° W. mag.) of Akwida fort, distant 1,400 yards. It is the summit of a bank on which there are from 2¾ to 4¼ fathoms water, and 6 to 7 around.

Akwida rock, on which there are but 3 feet, lies S. 27° E. (S. 9° E. mag.) of the fort, distant 1$\frac{1}{10}$ miles. It is one of the most dangerous in this locality and has from 5 to 7 fathoms water close to. It does not always break.

The Sisters.—At 600 yards S. 15° E. (S. 3° W. mag.) of the fort are two rocks named The Sisters, which generally break. They are on a bank upon which the depth varies from 2¼ to 5 fathoms, and 5½ fathoms around.

Shoal.—A shoal 4¾ fathoms lies 1½ miles S. 58° E. (S. 40° E. mag.) of fort Akwida. Inside of this shoal is a long reef which extends almost to the coast. The reef has from 3 feet to 4 fathoms on its various heads and ends near the beach in a large rock above water. There are 4 and 4½ fathoms between this rock and the beach. Eastward of this rock, at a distance of 850 yards, is a breaking rock, and in shore of this last rock is a reef.

Achowa bank, with a least depth of 2¾ fathoms, lies 1,400 yards S. 38° W. (S. 56° W. mag.) of Achowa point, and has from 5 to 8 fathoms close around.

Achowa village.—The village of **Achowa** stands in a small sandy bay, ½ mile northward of the point of the same name, and **from** thence a rocky indented coast extends to Dix cove.

Dix cove.—This cove is nearly 400 yards wide at the entrance, and about the same in length, but full of rocks; these leave, however, sufficient room in some places to moor boats or very small vessels. A conical heap of rocks, forming a small islet, lies S. 50° W. (S. 68° W. mag.) of Dix Cove fort, and a reef of rocks extends from it 230 yards in a SE. direction, leaving a narrow channel on each side of it.

Ahanta point, the SW. entrance point, is surrounded by a belt of rocks, which occupies half the cove; and from Swanzi point, on the eastern side, a similar belt fronts the shore to Hood point, about ¼ mile NE. of it. On this belt, and 100 yards southward of Swanzi point, there is a black rock, named by the natives Kumbrini. There are two boat channels into Dix cove; one between Kumbrini and Islet reef, in which at low water there are only 3 feet abreast of the islet; and the other between Islet reef and Ahanta point, with 6 feet in it; they are both very narrow, but the eastern is generally preferred, though leading close west of Kumbrini rock. At low water and with fresh southerly breezes, the sea breaks entirely across the entrance to Dix cove, but it seldom happens that the natives can not get off to a vessel in their canoes; and in fine weather ordinary boats can generally land and find shelter in the cove; the bottom is sandy, with a depth of 3 or 4 feet among the rocks.

Dix Cove fort.—The town is on the north side of Dix cove, and extends from the fort to a piece of water, which is stagnant, except during a portion of the rainy season, when it is always a resort for alligators. The fort is of a square form, standing on ground about 30 feet above the sea, north of Swanzi point, and its battlements are about 30 feet high. It has a large tank for its own use, but vessels of war may generally obtain water from it on application. Very long hose are required to lead the water from the fort, to a boat at anchor in the small bight at its base. Although the country is covered with forest, the natives object to its being cut anywhere near the town, so that Dix cove is not a good place for wooding. Some supplies may, however, be procured here, but not in sufficient quantity for a vessel of war of any size.

At a mile inshore from the fort, the land rises to a height of 250 feet, and at 6 miles to the northwestward mount Swanzi is 390 feet above the sea.

There are several large trading houses on the beach which may assist in identifying the place, but the fort is very conspicuous when approaching Dix cove. At night the lights of the town are of good service.

Abokori islet.—At one mile northeastward of Dix cove is a small low rocky islet named Abokori, some portions of which are covered with coarse

grass. The channel between this islet and the coast is ½ mile wide, but near the middle there is a rocky shoal of only 2¾ fathoms, with a narrow passage on either side of it 3 or 4 fathoms in depth. A few rocks surround the islet, but not extending farther than 130 yards from the shore. This channel affords no shelter for vessels.

Butri.—In the small sandy bay opposite Abokori islet stands the little village of Bushau, close to the beach; the bay terminates 1½ miles farther eastward at Butri point, which is bold and rocky. North of this point there is a rivulet, on the western side of which stands the ruins of the small fort of Butri or Bartenstein, close to the beach. Bartenstein hill, covered with high trees, and northward of the fort, rises to the height of 440 feet.

The landing is very good at the mouth of the rivulet, though numerous large bowlders must be avoided.

Coast.—At 1½ miles eastward of Butri a sandy projection of the shore terminates in Adoblo rock, a large black rock shaped like a haystack; from this the character of the coast changes from being almost steep-to, to being fronted by reefs, with irregular soundings and projecting rocky shoals. Adoblo rock is surrounded by one of these reefs, extending ¼ mile from it in all directions, and at 1¼ miles farther to the northeastward, another reef extends more than a mile from the shore into the stream of 10 fathoms; among all these shoals there are intricate channels available for boats.

Pompendi point.—At about 3½ miles from Adoblo rock stands the town of Pompendi, on a projecting point, which consists of two stony hillocks with a sandy bay between them; several rocks on which the sea at times breaks heavily lie south of Pompendi point. Above the town there is a grove of large trees, which helps to distinguish the place.

Shoal.—A shoal, with 3 fathoms on it, lies 2¾ miles N. 83° E. (S. 79° E. mag.) of Adoblo rock and one mile from the shore; from the shoal the grove of trees at Pompendi bears N. 16° E. (N. 34° E. mag.).

Pompendi reef.—From the south extreme of this reef, which extends ¼ mile from Pompendi point into the stream of 6 fathoms, the grove of trees bears N. 26° W. (N. 8° W. mag.); foul ground extends to the eastward of Pompendi point for nearly a mile.

Ajua.—The village and low rocky point of Ajua are northeastward of Pompendi, distant 1½ miles, and thence a white beach extends 4 miles to the low sandy point of Takoradi. In this space there are two shoals with 2½ and 3¼ fathoms on them, both bearing S. 29° E. (S. 11° E. mag.) from Ajua, the outer and deeper lying ¾ mile off shore; a little farther to the eastward a broad belt of reefs commences and continues to fringe the shore to Takoradi point, the average distance of its outer edge from the coast being about ½ mile. On reaching that point it turns suddenly toward the shore, in a

northerly direction and then again suddenly turns to the eastward for a distance of about $\frac{2}{3}$ mile.

The village may be distinguished by the European houses on the shore, one being conspicuously placed on the point.

Takoradi reef, detached from the fringe of shore reefs, lies still farther out; in shape it is circular, its diameter is $\frac{1}{8}$ mile, and the center bears S. 74° E. (S. 56° E. mag.), distant about $\frac{3}{4}$ mile from Tokoradi point. Several of the rocks upon it show above water, and it will be safer for vessels not to approach it within 10 fathoms. A depth of 5 fathoms will be found at the edge of the surf, being $1\frac{1}{10}$ miles from Takoradi point. In navigating between Dix cove and Takoradi point, vessels should not approach nearer to the shore than 11 fathoms, unless desirous of trading.

Takoradi bay.—Sekondi point bears from Takoradi point N. 41° E. (N. 59° E. mag.), distant $4\frac{1}{4}$ miles. The coast recedes suddenly to the northward at Takoradi point and forms Takoradi bay, the coast of which is composed of several small bights, divided by rocky points. The ruins of a fort stand on the south side of one of these bights, upon a bold point, about 80 feet above the sea, and nearly north, distant 1,800 yards from Takoradi point; it is now a complete ruin, and so overgrown with shrubs and trees that it can not be easily distinguished. There is a grove with some tall trees a little northward of the fort, which are very conspicuous; at the base of the fort there is a village, and another at Apoasi a mile north of it, the natives of which were treacherous. At both of these places boats may land with facility under the protection of the adjacent reefs. The bottom of the bay is of sand and mud, but rocky near the reefs off Takoradi point. The rollers, which to the westward of that point generally break in upwards of 2 fathoms, are here comparatively smooth.

Takoradi bay affords more shelter than any other anchorage between Fernando Po and Sierra Leone. Water can not be procured, but goats, ducks, yams, and fruit are abundant.

Barraocouta rock, with $2\frac{3}{4}$ fathoms on it, lies N. 21° E. (N. 39° E. mag.), distant $1\frac{3}{4}$ miles from Takoradi point, and 600 yards from the shore.

Sekondi point is a bold rocky cliff 50 feet above the sea, surmounted by fort Orange, which is a square building of about 180 feet each way, with bastions at the angles.

Sekondi is said to be the eastern extremity of the Ahanta country. The soil in the vicinity is fertile, and the people industrious. The yams obtained here are supposed to be the finest on the Gold coast; and the native fishermen cure fish, with which they traffic in the interior.

Landing.—A flat rock extends a short distance under water NE. from Sekondi point, and there is a ledge, on which the sea breaks, about 250 yards north of the point; there are 2 fathoms inside this ledge which shelters the landing on the beach at the village. In every other direction a vessel may

almost lie alongside the point, close to which there are 5 fathoms, but the soundings are very irregular when approaching it. The bottom is of sand and mud.

Coast.—Aboaddi point is the next salient point east of Sekondi, and from it is distant 4½ miles, the coast between forming a bay about a mile in depth, containing several sandy beaches and abrupt rocky points, off which there are generally a few rocks. Between its extreme points the depths are from 4 to 5½ fathoms, decreasing regularly to the shore, and with no danger at ¼ mile from the beach. The surrounding shores have a broken appearance, though of a tolerably uniform height when viewed from a distance of 4 or 5 miles, and are without any remarkable features.

Suchu reef.—Off Suchu point, midway between Sekondi and Aboaddi point, there is a small reef ½ mile in length, extending parallel to the coast, with a boat channel inside it. Off the mouth of Anamkwon river (which is barred in the dry season) about a mile NE. of Suchu point, there are a few rocks.

Aboaddi point is a double point of low rocks, from which a narrow reef extends ½ mile in an easterly direction; several rocks on this reef are above water, one of which has a white top, and lies 300 yards from the point.

Landing.—There is a village at the foot of the hillock which rises from Aboaddi point, and the landing to the eastward of it is good, being sheltered by the reef which extends from that point.

Sherbro bank.—A shoal of 19 feet, with 4 fathoms around it, lies off Aboaddi point; from the shoalest part, Aboaddi point bears N. 24° E. (N. 42° E. mag.), distant 1¼ miles, and Sekondi fort bears S. 72° W. (west mag.); Sherbro bank is about ½ mile in extent, and breaks when the rollers are unusually heavy.

Roani bank.—At 3 miles south of Aboaddi point, in the stream of 11 fathoms, there is a rocky bank one mile in length, named Roani bank; the least depth on it was formerly supposed to be 7 fathoms, but in 1870 a 6-foot shoal was reported. It si said to be a favorite fishing ground. This 6-foot patch was searched for in 1881 and not found.

Bassubu rocks.—These rocks lie NE. of Aboaddi point, distant ¾ mile, the coast between forming a little sandy bay, and from them a reef projects nearly ½ mile in an easterly direction. At ½ mile farther to the northward there is another foul point with a similar reef extending from it, and from thence to Chama bay the coast is fringed by a succession of reefs, with 3½ fathoms close to their outer edge. They lie within ½ mile from the shore; but there is one detached rock which generally breaks, and which bears S. 46° E. (S. 28° E. mag.), distant 1 1/10 miles from the fort of Chama, being one mile from the shore.

Another (Mamua) rock, with 17 feet water over it, lies $1\frac{2}{10}$ miles S. 80° E. (S. 62° E. mag.) of Chama fort. It has depths of from 23 to 26 feet water around it.

Chama bay, extending from Aboaddi point to the red cliffs of Kotobrai, is nearly 2 miles deep, with regular soundings outside of the 5-fathom line.

The fort of Chama (pronounced by the natives Eshama) stands upon a rising ground about 300 yards from the beach, behind the native town, which it overlooks. It is a strongly built square edifice, with bastions at the angles and surrounded by a wall; the truck of the flagstaff is 74 feet above the sea. The approach to Chama fort is obstructed by reefs of rocks, through which there is a narrow passage for boats at low water (provided the surf be not high), as the winding channel between them may then be perceived. At high water they are all covered except a few large bowlders, and the sea breaks so heavily as to present to a stranger no apparent channel. The landing place is to the eastward of the fort, though canoes safely wind their way among the western rocks.

Owing to its dark color, Chama fort is not easily recognized from seaward.

Busum Prah river.—At one mile NNE. of Chama fort, the Busum Prah river flows into the bay between two lagoons. It is said to come from a considerable distance inland, but was only examined for about $2\frac{1}{2}$ miles from its mouth where it was 100 yards across and 4 fathoms in depth. The water was quite fresh, and the banks, which were fringed with mangroves, were only 3 or 4 feet above the stream. There was only a depth of 2 feet on the bar, which was impassable by ordinary boats, the natives, nevertheless, most adroitly paddled their canoes both in and out of the river. The river is said to be navigable 90 miles above its mouth, above which there is canoe communication with Kumasi.

The ground, which to the westward rises considerably above fort Chama, sinks into a flat country to the northward. Some hills, however, are seen in the NW. and one NE., distant 9 miles from the fort.

Prah rock, on which there is but 6 feet water, with 3 fathoms close round it is very small; it bears N. 78° E. (S. 84° E. mag.) of Chama fort, distant one mile, and S. 46° E. (S. 28° E. mag.) of the mouth of Busum Prah river, distant $\frac{3}{4}$ mile.

Anchorage.—Vessels may anchor in Chama bay in 7 fathoms, sand and mud, with the fort bearing N. 63° W. (N. 45° W. mag.), distant about $1\frac{1}{4}$ miles; the trend of the coast affords considerable protection from the swell even in the rainy season.

Kotobrai cliffs.—A straight beach, nearly 4 miles in length, extends from Busum Prah river to the red earth cliffs of Kotobrai. These are five in number, with small sandy bays between them, and some large rocks above water at their base. An irregular line of rocks and breakers com-

mence a mile to the westward of these cliffs, and fronts their whole length, but it extends only ¼ mile from the beach. The highest land in the vicinity of the cliffs is about 270 feet high, whence the ridge descends gradually to the lagoon near Bussum Prah river to the westward, and to Abroti river to the eastward. That river, like most of the streams on this coast, has no communication with the sea till the rains begin.

Gold hill.—Assai point, or Gold hill, is eastward 3½ miles from Kotobrai cliffs, the coast between being nearly a straight beach of sand. The point forms but a slight projection from the coast line, but, being surmounted by an isolated hummock, it has a remarkable appearance when seen from the westward.

Kommenda point.—From Gold hill to Kommenda point the shore is low and fronted by rocks. Kommenda point is also low and rocky, and close eastward of it the Susn river passes between the forts of Kommenda. The fort, standing on the western side of the river, is a square building of about 190 feet each way, with bastions at the angles, but having been for some years abandoned, it is rapidly going to decay.

Landing.—A native town stands at the foot of each fort, and tolerably good landing will be found in the little recess of the beach between them, under the high bar of Susn river, the waters of which seldom break through it in the heaviest rains, but expand into a shallow pestilential lagoon.

Ampeni point is 3 miles ENE. of Kommenda point. Between these points the shore recedes slightly. A ledge of rocks extends eastward from Ampeni point about 400 yards.

Kassi reefs, which extend east for a distance of 1½ miles, are separated from the ledge off Ampeni point by a 2-fathom channel available for boats. A depth of 3½ fathoms is found close to the outer edge of the reefs, and the surf at times breaks over them in high rollers. The depths inside Kassi reefs are very irregular, there being 4 fathoms on one side and 2 fathoms on the other.

Ampeni.—The town of Ampeni which stands on the shore at ½ mile eastward of Ampeni point, contains a large population; and a little farther to the eastward there is another town, Akimfu, which is built on the summit of a small hill. Between the two towns the Akiabu river comes down to the back of the beach, after winding among the rising grounds that approach the coast on its western side; at ¾ mile east of Akimfu there is another pent-up river, named the Branu. The land about here appears broken into small hills, one of the highest of which, on the eastern side of Branu river, is 200 feet above the sea.

Amkwana.—The village of Amkwana stands on the beach about 1½ miles eastward of Branu river, and a little east of the village there is another stagnant river, known as the Bibo.

Busum Accra reefs.—From about ¾ mile west of Amkwana the Busum Accra reefs front the shore for a distance of 2 miles, showing themselves in four distinct patches, on which the rollers break heavily. There are 4 fathoms close to their outer edge, and their eastern extreme lies ½ mile from the shore.

Coast.—From Amkwana to Elmina the coast rises into downs of moderate elevations at various distances from the beach; many of them have been cleared of forest, and are now cultivated. The beach is a hard sand, and nearly straight for 3 miles to Elmina point.

Elmina point, the western extremity of Elmina bay, and on which stands the fort of St. George del Mina, is surrounded by rocks, which extend to the eastward, and on which the sea breaks with great violence, especially when the sea breeze sets in.

The outer rock on the reef extending eastward from Elmina point uncovers 2 feet at low water, and has a depth of 8 or 9 feet close outside it; this rock lies 150 yards from the extremity of Elmina point.

In fine weather rollers break at a distance of 300 yards from Elmina point, but in bad weather they extend to a distance of 600 yards from the shore. In the vicinity of this reef the bottom is composed of fine black sand.

Elmina bay.—From Elmina point the shore recedes to the northward for about ⅓ mile, forming Elmina bay; the surrounding country is undulating and thickly wooded, with some country residences and cultivated farms which belong to the merchants, and which afford agreeable retreats from the heat of the town.

Elmina castle.—The castle of St. George del Mina was, with the other Dutch settlements on the Gold coast, transferred to the British government in 1872. The castle stands on a low rocky peninsula, on the southern side of the small river Beya, which passes within 20 yards of one of its gates. This peninsula is connected by a wooden bridge with the opposite bank, and from this bridge to the sea the river is confined between two stone embankments. A large native town, which occupies the whole breadth of the isthmus, extends along the beach westward of the castle, and communicates with it by a drawbridge.

The fort of St. Jago stands on a hill about 100 feet above the sea on the north side of Beya river; De Veers redoubt is westward of the town south of the river, and Beckenstein redoubt near Beya river, to the westward of fort St. Jago.

Elmina is a good place to make when coming from the westward and bound to Cape Coast Castle. The fortifications are yellow, while those of Cape Coast are red.

Tides.—It is high water, full and change, at Elmina at 4h. 30m.; springs rise 6 feet.

Anchorage.—In Elmina bay there are depths of from 18 to 24 feet until within about 250 yards from the beach, and the same distance from the reef extending from Elmina point; the bottom is of fine black sand, fair holding ground.

The usual anchorage off Elmina is in 7 or 8 fathoms, sand or shell and mud, with St. George castle bearing N. 69° W. (N. 51° W. mag.), distant about a mile; or with mount Ekwafu well open eastward of fort St. Jago. If necessary, a vessel may anchor for the night in 13 fathoms 5 miles off the land, between Elmina and Cape Coast Castle.

A government surf boat communicates with vessels of war lying off Elmina.

Supplies.—Fresh beef is scarce. Vegetables can be procured by giving short notice.

Coal.—There is a contract for the supply of coals to English war vessels at Elmina, but coaling can only be very slowly performed. Vessels should not anchor in less than 6 fathoms while coaling.

Beya river.—The channel leading into this river lies on the northern side of the passage between the stone embankments, and is from 3 to 4 feet deep.

Between Beya river entrance and the reef extending from Elmina point, there are depths of from 3 to 8 feet, over fine black sand with rocky patches.

The bridge across the river within the entrance is 6 feet above high water, and is built on two arches, each 20 feet wide; above this bridge for a short distance Beya river is about 40 feet wide, with a depth of from 3 to 4 feet in mid-channel on a black sandy bottom.

The entrance to the Beya is now obstructed by a bar, and is not a safe landing place for ship's boats, at or near low water.

Current.—The current follows the course of the shore round Elmina bay from west to east; there is an indraught to Beya river on the flood.

Coast.—A slightly curving beach, nearly 7 miles in length, extends from Elmina to Cape Coast Castle; near its western extremity there are two small barred-up rivers, and between them the shore line is rocky, but the rest of the beach is clean and the soundings up to it regular.

Cape Coast Castle.—The castle of Cape Coast is built on a rock which stands on a projecting point of the line of the shore. From the landing place the ground rises gradually to the castle, which contains the official residences, with a chapel, school, hospital, and storehouses, besides the hall of justice. There are also several spacious water tanks, from which vessels are occasionally supplied, but only by permission. At a short distance from the castle there are three detached forts situated on commanding hills—fort Victoria, fort Macarthy, and fort William. The forts are colored red.

Landing.—The landing place is in a small bay under the NE. bastions of the fort, behind some rocks which generally afford some shelter from

the sea. During the dry season landing in ordinary boats is frequently practicable.

Light.—The lighthouse at fort William is a white circular stone tower 46 feet high. It stands 600 yards inland and exhibits from an elevation of 192 feet above high water a light that in clear weather should be seen for a distance of 8 miles all round the horizon.

Signal station.—At fort William the international code is used.

Town.—The town, which is named by the natives Igua, occupies a considerable space in the northward of the castle; and besides long lines of native huts, contain some handsome European houses; the Episcopalian church and Wesleyan chapel are the most conspicuous public buildings.

The rock of Tabara is the native name for the great mass of granite on which the castle stands, and a large solitary stone standing on the beach about ¼ mile westward of the castle is known as Tabara's wife. A little farther westward there is a small salt water lagoon, which is only separated from the sea by the ridge of the beach; at the SW. corner of the lagoon there is a little sandy hillock named mount Edgecumbe. There is a contract for meat here.

The number of inhabitants at Cape Coast Castle is about 10,000, almost all of whom are natives.

The United States is represented by a consular agent.

Communication.—Mail steamers leave Liverpool every Saturday and Hamburg monthly for the Gold coast.

Anchorage.—During the dry season vessels may anchor anywhere off the castle (avoiding a shoal of 3 fathoms, nearly 400 yards S. 63° E. (S. 45° E. mag.) of the castle), as the ground is clear of rocks, the bottom being generally fine dark sand, with sometimes minute broken shell, and the depth decreases regularly and slowly to the shore; but in the rainy season, when there is usually a long swell, it will be prudent to anchor in 10 fathoms, with the castle and lighthouse in line, bearing N. 35° W. (N. 17° W. mag.), and about 1½ miles from the castle.

Vessels should ride with 60 or 70 fathoms of cable.

In the tornado season vessels not moored frequently foul their anchors.

Current.—The current which generally runs to the eastward at the rate of a knot per hour frequently turns to the westward for a few hours after a heavy tornado. After several days of light winds a westerly current is sometimes met.

Tides.—It is high water, full and change, at Cape Coast Castle at 4h. 30m.; springs rise 6 feet.

Mumford point.—The village of Mumford is at the foot of the hill which rises above Mumford point, lying ½ mile from Cape Coast Castle; and at ¾ mile N. 72° E. (east mag.) of Mumford point there is a large granite bowlder on the edge of the shore named by the natives Abu Ketu.

Queen Anne point from Cape Coast Castle is distant 1¾ miles; the intermediate coast consists of many small bays and rocky points with rocks close to them, which cause an almost continuous line of breakers along that rugged shore. The point is bold and cliffy, and rises to the hill of Akwon with a village and the ruins of a fort on it. At the western side of the hill the small barred river of Barka terminates; the adjacent land is hilly and covered with trees.

Mori point.—This point bears northeastward of Queen Anne point distant 1½ miles. In the rocky bay between there are several rocks lying from 100 to 120 yards off shore, and on an eminence above the point are the ruins of fort Nassau, difficult to make out. It is a square building like Sekondi fort, and appears to be of about the same size. A rock lies 400 yards eastward of the point, showing two black heads, on which the sea breaks. There is a 2-fathom channel inside of it. To the eastward of Mori point there are two barred-up rivulets, the Eper and the Amfur, and from the latter a clean shore, partly sand and partly rock, extends from 1½ miles to the bold commanding point of Anashun.

Briwa rock.—At nearly a mile eastward of Anashun point and ⅓ mile S. 29° E. (S. 11° E. mag.) of the trading house on an eminence in the village of Briwa, there is a rock which breaks with 3 fathoms between it and the shore and 4 fathoms close to its outer edge.

Gwonkom river.—A little to the eastward of Briwa village there is a small lagoon and farther on a barred river named the Gwonkom. Between Anashun point and Anamaboe, a distance of 3 miles, the beach is very foul, with rocks extending from it to the distance of ¼ mile in some places. Between Gwonkom river and Anamaboe there are several large black rocks close to the beach.

Anamaboe fort.—The fort of Anamaboe stands in a little cove upon a a flat sandy beach. It is a square building with regular bastions at the angles, and contains good barracks and storehouses and other buildings for the accommodation of a garrison. The fort is not readily seen.

Great Tree hills.—The country in the vicinity of Anamaboe and Kormantan is diversified with hill and dale, but does not appear to be heavily timbered; there are, however, some remarkably large trees farther to the westward, on a ridge of hills about 4 miles north of Cape Coast Castle.

Kormantan hills.—The elevations which will attract the attention of the mariner about this part of the coast are the five hills of Kormantan, which vary from 440 to 610 feet in height, and lie 2½ miles NNW. of Anamaboe; a group of three hills lies about 2 miles farther to the northward, and 4 or 5 miles to the northward of these is situated a blue ridge, on which there are three hummocks.

Anchorage.—The westernmost of the five hills of Kormantan, in line with Anamaboe fort, bearing N. 32° W. (N. 14° W. mag.), is a good mark

for anchoring, as the bottom on that line is of excellent quality, blue mud with sand and shell. The approach to the shore is quite regular from 9 fathoms at 2 miles distance to 6 fathoms at one mile, so that a vessel can take any berth according to the season.

Aga point.—At about a mile eastward of Anamaboe is Aga point, with a small native town upon it; some ledges of rock extend ¼ mile east of the point and Aga hill rises above it.

Kormantan fort.—On a hill which rises from a bold rocky base about a mile NE. of Aga point stand the ruins of fort Kormantan, which is a square building about 100 feet on each side, with bastions at the angles and an outwork. On the southwestern side of the fort there is a tower 146 feet above the sea.

Landing.—On the western side of fort Kormantan, on the slope of the hill, there is a small native village, and on the eastern side a winding path leads to a little sandy bay, which is the usual landing place. The small river Etsin, barred in the dry season, discharges its waters by two branches during the rains, one into this bay and the other nearly a mile farther to the eastward.

Kormantan town.—On the eastern side of the valley which Etsin river drains, at the distance of about a mile from the fort, the large native town of Kormantan stands at the corner of a ridge of high ground. In the town there are some very large trees, the tops of which, being 260 feet above the sea, may be seen when as far to the westward as the anchorage off Cape Coast Castle.

Salt Pond town, a trading station of some importance, is about 15 miles eastward of Cape Coast Castle.

Coast.—At Kormantan the character of the coast again changes, turning suddenly to the eastward, and preserving an unbroken line of straight sandy beach for 15 miles to the village of Kuntamkweri. In this extent the approach to the coast is clear, without any offlying rocks, and the soundings are regular, over a bottom of fine sand and broken shell. The coast is very low, and on its margin are situated 10 villages, each standing in a dark clump of cocoanut trees. There are also a few streams, of which the Amisa and Nakwa are the largest. The former is said to come from a long distance in the interior, its source being close to that of Busum Prah river, which enters the sea near Chama; in April the current of the Amisa was just strong enough to force a small channel through the sand, not sufficiently wide for a canoe to enter, but it is said to be deep within. Nakwa river, 5 miles farther to the eastward, spread into a lagoon inside the beach in April, but in May it opened a channel and discharged a large volume of water. At Imuma and Sasra there are salt-water lagoons, and from behind those villages the land begins to rise to a higher elevation. North of Nakwa, distant 3 miles, there is a peaked hill named Brabra

Pow, about 430 feet above the sea, and the hill lying north of Kuntamkweri, which is 380 feet high, is visible from the tower of fort William at Cape Coast Castle. Most of this part of the coast is cleared of trees and covered with long grass.

Tantamkweri point.—Two miles of alternate rock and sand extend from Kuntamkweri to Tantamkweri point, where there is a native village named Tuam, with a conspicuous whitewashed house in front of it; the landing there is difficult. The old castle of Tantamkweri stands on the crest of a rocky hill, ¼ mile eastward of the point; it has long been abandoned, and is now a complete ruin covered with jungle. It may be recognized by a large tree growing apparently in the fort.

Babli point lies 1½ miles from Tantamkweri point; it is a large black rock, on both sides of which there is a good deal of foul ground. On each side of it there is a stagnant lagoon, and at ¼ mile inland from the point, the village of Deggu appears on a rising ground near a grove of tall trees. North of Deggu, distant 3¼ miles, there is a table-topped hill, 520 feet above the sea, named by the natives Kwaben; and further inland there are four other hills, known by the names of the four cardinal points of the compass.

Gamma.—From Babli point the coast to the northeastward is formed by several small sandy bays and points, with some detached rocks about them, but not extending more than 150 yards from the shore. The town of Gamma stands on the eastern part of a high double point of rock, 3 miles from Babli point. At one mile N. 72° E. (east mag.) of Gamma, and 400 yards from the shore, there is a rock which breaks, with 2½ fathoms close round it.

Apam point.—This point lies NE. of Gamma, distant 2½ miles, and appears like a small hummock on the eastern side of a saddle-shaped hill, which rises immediately from the sea, and which is surrounded by rocks above and under water; these rocks extend nearly ½ mile along the coast on either side, and the same distance to the eastward. On the hummock stands a white fort with flagstaff; to the westward of the fort and near the beach is a white house.

Landing.—The bay to the eastward of Apam point is smooth, though shallow, being sheltered by the point and its surrounding rocks; the landing is good and dry when a canoe is employed, but too shoal for ordinary boats. The little river of Apam has its entrance at the head of the bay, ½ mile north of the hummock, but the bar is only passable by canoes. Inside the bar the river spreads into a salt-water lagoon.

Rocks.—Eastward of the Apam river there is a sandy beach 1¾ miles in length, extending as far as the rocky point of Kitchoru; and in the space between there are some detached rocks, which extend nearly ½ mile from the shore, with a 2-fathom channel inside. Two of them are always

above water and appear black; they are named by the natives the Assakri.

Eastward of Kitchoru point, there is a long ledge of rocks on which the sea breaks heavily; it is ¼ mile in breadth, and fronts the beach for the distance of a mile to the foot of Mamkwadi hill. The natives of Mamkwadi village ply their canoes amongst these breakers with great dexterity, and beach and launch them freely under the shelter they afford.

Wreck.—The wreck of a bark, with about 3 fathoms over the hull, lies in 5½ fathoms water, with Assakri Black rocks bearing north (N. 18° E. mag.), Mumford Fort point S. 62° W. (S. 80° W. mag.), and Apam fort N. 69° W. (N. 51° W. mag.).

Mamkwadi hill is bold high land with a steep ascent from the sea; its highest point at the SE. extreme of the ridge is 670 feet high. The high range of Mamkwadi lies in an east and west direction, between 5 and 6 miles inland; the highest point of these hills is 930 feet above the sea; they are covered with vegetation, and the trees on some of them are of large dimensions, forming conspicuous objects for a long distance on either side.

At one mile eastward of Mamkwadi hill, the little river of Munni forces a shallow passage through the sand, but in the rainy season it is the outlet of a large body of water.

Winneba point, which is low and rocky, is ENE. distant 7 miles from Apam point. The town of Winneba stands on the beach of a small bay on the eastern side of the point, and above the town are situated the ruins of á fort. Two whitewashed trading houses on the point, are easily seen when approaching from the westward. At low water the landing here is good for canoes, being sheltered by the reefs extending from the point, which are then uncovered; but at high water it is very difficult.

The natives are described as turbulent and ferocious; yet English merchants formerly resided there and carried on some trade. The neighboring country is rather low, but undulating, and with more brushwood than forest.

Ainsu river.—This river flows into the sea at a mile northeastward of Winneba point, and being somewhat sheltered by that point, as well as by the adjacent rocks, its mouth is always open.

Coast.—From Ainsu river a straight sandy beach extends E. by N. for a distance of 6½ miles to Meredith point, when the coast again becomes rocky and turns more to the northward. In this space the coast is low, but behind it the land rises into gentle hills, the highest of which, mount Senia, is about 370 feet above the sea; these hills are generally bare of trees, but covered with low stunted bushes.

Long hill, with a grove on its summit, rises to a height of 550 feet, and bears N. 38° W. (N. 20° W. mag.), distant 6 miles from Meredith point.

At about 10 miles north of the same point, a hill with two remarkable

hummocks rises to a height of 770 feet; its local name is Appra, but to seamen it is generally known as the paps.

Camels hump.—Northwest of the paps and 16 miles inland, there is a still higher range, which extends 6 miles in a NE. and SW. direction; near the center of the range one part of it, which assumes the shape of a camel's hump, attains nearly to the height of 1,200 feet above the sea. All the hills seem to rise out of an extensive plain.

Barako point, which lies ¾ mile NE. of Meredith point, is moderately high and rugged, and of a dirty red color. On an eminence above it stands the native town of Senia, as well as the abandoned fort of Barako, which is in a state of rapid decay.

Senia is large and much cleaner than most of the towns on this coast. It is said that vast numbers of large baboons infest the neighborhood of this place and commit great depredations.

Coast.—From Barako point to the northeastward, the coast is formed by small sandy bays and rocky points, at the base of which lie a few rocks; the land rises to a ridge of moderate height, which lies in a parallel line to the coast as far as Fetta bay.

Fetta point, 2⅔ miles northeastward of Barako point, is sandy on the western side, but to the eastward a rocky cliff turns at right angles to the coast and forms a bay ½ mile across, at the head of which the town of Fetta stands upon a rising ground, with the little river Kaku winding round its foot. When closed in the dry season, this river spreads itself into a lagoon beneath the town.

The village of Fetta consists of 40 or 50 mud huts with a population of about 400. Off Fetta the water is rather shoal, there being only 4 fathoms at a mile from shore.

Supplies are scarce. No good water. Fish can be caught in the river. Turtle are caught occasionally.

Landing.—The landing place is the sandy beach at the foot of the cliff under the village, the rocks off Fetta point breaking the swell. Whaleboats can generally land.

Coast.—At ½ mile northward of Fetta point a reef projects about ¼ mile from the shore; the remainder of the coast is clean as far as Nianyano village, which stands among a grove of high trees, 4 miles northeastward of this reef; at the foot of the village a little river passes from behind a small rocky point into the sea. A few rocks lie close off the mouth of the river, and to the eastward of it a long beach, but slightly curved and everywhere safe of approach, extends for 12 miles to Accra.

Country.—At about 2 miles northeastward of Nianyano village the remarkable hill of Dampa will be observed close to the shore; its name among the old traders on this coast was the Cooks loaf. This hill is the

western termination of a range of high land, lying in a NE. and SW. direction, and which, though it appears to have many breaks in its continuity, steadily increases in height from the coast. At 2 miles from Dampa hill this range is 600 feet above the sea; at 17 miles, 1,350 feet; and at 22 miles, 1,560 feet; from whence to the NE. it falls to 1,430 feet, but everywhere appears to be covered with forest. Westward of this range, and about 18 miles north of Dampa hill, there is a conspicuous peak known as Akem peak, apparently isolated, and about 1,000 feet in height.

The part of the range lying 2 miles north of Dampa hill, is a table-land, and round its eastern extreme Sekum river winds down to the sea, which it enters through an open mouth; the surf, however, was too high for a boat to enter. The stream is supposed to be the eastern boundary of the Fanti country.

Accra.—Accra point is formed by a large rock, with its southern extremity (on which fort James is built), rising only 36 feet above the sea. The fort is nearly square in shape, and about 145 feet each way, with regular bastions. There is a tall flagstaff on the fort.

Landing.—A few detached rocks lie round the base of fort James and the landing place is on a small sandy beach, scarcely sheltered by those rocks. The surf is so high, and it requires so much skill, as well as local experience, to pass through these dangers with success, that ordinary boats should never attempt to land; but the natives in their canoes have, from long practice, acquired the habit of landing and embarking with ease and safety.

Light.—A building 18 feet high, painted red, stands on the western bastion of fort James; it exhibits from an elevation of 50 feet above the sea a fixed white light, that should be visible in clear weather from a distance of 10 miles.

Town.—The town extends NE. and NW. from the fort; it consists of several narrow streets of native dwellings and some good houses belonging to the English merchants. Westward of the town there are some brackish pools of water, which stagnate after the rainy season.

There is a constant communication between Accra and the Ashantis, who bring from the interior much of the gold exported from this place; the country, as far as the high range of hills recently mentioned, is a fine open plain with a light soil, covered with shrubs and not much heavy timber. The distant hills are covered with dense forest, but the valleys between them are described as fertile and beautiful.

On the eastern side of fort James, between 600 and 700 yards from it, are the ruins of the fort of Crevecœur. It stands upon a rocky cliff about 50 feet high, and appears to have been of an octagonal form, with a large inclosed space adjoining it, which was probably the slave yard.

At 2 miles eastward of fort James, the castle of Christiansborg stands upon a rocky point, about 35 feet above the sea. On each side of it the beach forms a small sandy bay, and in front there are a few ledges of rock, on which the sea breaks heavily. Its principal part approaches the form of a square, of about 190 feet in the side.

There is a good road between the castle and Accra, with trees on each side, which render it an agreeable walk or drive.

The native town, which lies northward of the castle, has not a very clean appearance; to the westward of it there is a martello tower on a small sandy eminence, and also a black wooden windmill. Farther inland there are a few detached dwelling houses.

Earthquakes.—In 1863 the town was destroyed by earthquakes, and in 1883 several severe shocks were experienced.

Supplies.—Water, cattle, fruit, vegetables, and other supplies may be obtained at Accra. Fish may be caught in abundance at the anchorage.

Telegraph.—Accra is in telegraphic communication with Sierra Leone, Porto Nova, Lagos, and England.

Communication.—Mail steamers leave Liverpool every Saturday, and Hamburg once a month for the Gold coast.

Anchorage.—At a mile south of Accra there will be found a depth of 5 fathoms; at 1½ miles, 7 fathoms; and at 2 miles, 8 to 9 fathoms. During the dry season, vessels may anchor in 5 or 6 fathoms, but during the rains it will be prudent not to approach nearer than 8 fathoms.

The best anchorage is in 7½ fathoms water, with Accra castle bearing N. 47° W. (N. 29° W. mag.) and Christiansborg castle N. 40° E. (N. 58° E. mag.). A telegraph buoy is moored S. 45° E. (S. 27° E. mag.), $1\frac{8}{10}$ miles from fort James. Vessels must not anchor near the line.

Soundings.—The soundings along the whole coast from Cape Coast Castle to Accra are regular, shoaling gradually toward the shore, up to 3 fathoms, which is as close as boats can generally approach the surf. The quality of the bottom is fine dark gray sand, with broken shell and sometimes mud. By keeping outside the 7-fathom line all dangers will be avoided.

Zahrtman mount.—Northward, distant 6 miles from Christiansborg, there is a solitary hill in the plain, which has been named mount Zahrtman, the summit of which is 540 feet above the sea.

Tides.—On the coast between Accra and Volta river it is high water, full and change, at about 4h. 46m.; springs rise 6 feet.

Labadi village—From Christiansborg a sandy beach, with a few rocky patches upon it, extends eastward for a distance of 2 miles to the village of Labadi, which stands on a little rising ground in the center of a grove of high trees, nearly ½ mile from the beach. At 3 miles farther east there is a large native town named Tassi, but it is not easily preceived, the mud huts and ground being of the same color. The land in its vicinity is flat

for several miles inland, and covered with grass and a few clumps of low trees. To the westward of the town may be seen the remains of fort Augustenborg.

Shoal.—A shoal, on which there is a depth of 3 fathoms, lies N. 83° E. (S. 79° E. mag.) of Accra point, distant 3¾ miles. It is nearly a mile from the nearest shore at Labadi.

Coast.—Eastward of Tassi the coast line is a sandy indented beach, with a few rocks off the projecting points, and ledges at considerable intervals apart, but neither projecting more than ¼ mile. The country is open, with occasional trees or groves, instead of continuous forests, and the native villages are not so numerous and smaller than those to the westward.

Little Ningo.—This village, lying 2 miles from Tassi, stands on a rising ground, at ⅓ mile from the shore; and Temma, 5 miles farther east, has a similar position, with a green slope to a bay on its eastern side. On that slope there is a large round-headed dark tree, standing conspicuously alone, and helping to identify the place.

Greenwich rock.—In the space between Tassi and Temma villages, about 1½ miles southwestward of the latter, there is a small black rock on the eastern extremity of a ledge which fronts the shore; it is detached from the coast nearly 300 yards, and lies in the meridian of Greenwich.

Grove point.—At 1½ miles eastward of Temma village the beach forms a point from which a reef projects to the southward; and 1½ miles eastward of this is Grove point, with a similar reef projecting to the eastward.

Vernon bank.—From Grove point a spit, which has been named Vernon bank, extends 12 miles in an E. by N. direction, at an angle of about 1½ points with the general trend of the shore. Its formation is very irregular, some casts of the lead showing sand, others gravel, stones, and narrow ledges of rock. The average depth on it is between 5 and 6 fathoms, and on the shoalest part, which is 2 miles southeastward of Poni, there are 4 fathoms.

There is a depth of 10 fathoms close to on its southern side, and on the northern side 8 or 9 fathoms, with regular soundings from thence to the shore, over a bottom of brown sand with minute broken shells. It is believed that there is no danger on any part of this bank, but vessels would do well not to approach it unnecessarily within a depth of 12 or 13 fathoms.

Poni.—In a bay 1¾ miles eastward of Grove point is the town of Poni, on a rising ground ¼ mile from the beach; it can only be made out with difficulty. Two ledges of rocks lie at the foot of the hill, but they are of small extent.

Landing.—The usual landing place for Poni is on the beach close northward of Grove point, the reefs off which afford some little shelter.

Prampram.—Eastward of Poni, distant 3½ miles, the town of Prampram stands, like Poni near the summit of a low hill, and is ¾ mile from the

beach. It may be recognized by three white houses when approaching from the eastward.

Anchorage may be had in 6¼ fathoms at ⅛ mile from the shore, with the commissioners house bearing N. 18° W. (north mag.).

The landing place is about ⅜ mile southeastward of the upper town, on a clear part of the beach, between two rocky shoals, which extend a mile on each side and on which the sea breaks heavily. The white house of the District commissioner, with a flagstaff, and a white store, both on the beach, indicate the landing place. Landing is only practicable in surf boats.

Supplies are fairly plentiful, beef and mutton, live stock occasionally, also turtle. Game can be shot in the neighborhood.

Ningo river.—From fort Vernon, Great Ningo river is distant 4 miles; and the coast between is formed by a beach, fronted by two rocky shoals.

Ningo river, though small, is said to be always open, and navigable for canoes, whenever the heavy surf which rolls in upon the bar allows them access. Its entrance is very narrow between two low sandy points. On the eastern point stands fort Fredensborg, which shows as a large white ruin among a grove of tall trees.

Country.—The country immediately inland of the part of the coast east of Tassi, and to within a mile of Ningo river, is an extensive plain of pleasing appearance, partly open and partly diversified with groves of large trees, but covered neither by heavy forest nor unhealthy jungle. It contains many hills of various elevation, amongst which there is a picturesque group with a singular outline, rising to the height of 950 feet above the sea, about 12 miles inland, named by the natives the Krobo hills. Other hills will be seen to the NE., one of which from its form was named the Abbey dome; and at 18 miles northward of the mouth of Ningo river, the well-known peak of Ningo Grande attains the height of 1,431 feet; this peak is an excellent landmark when approaching the coast between Accra and cape St. Paul from the southward.

Coast.—For nearly 4 miles eastward of Ningo river the beach is fringed by a broad ledge of rocks, over which a small river discharges, and being protected by them, its mouth is probably always open. The edge of this ledge is nearly steep-to, there being a depth of 4 fathoms as close to it as a boat can approach; the heavy surf rolls over it incessantly. These rocks are the last seen upon this coast when proceeding to the eastward.

From the above ledge of rocks to the entrance of Volta river, there is an uninterrupted beach of 26 miles in length, and so slightly curved as not to recede more than 2 miles from the straight course between its east and west extremes, which is east. For 5 miles east of the ledge a low clay cliff rises immediately from the beach, but it then falls into a ridge of sand with a few bushes upon it.

This ridge is not more than 12 or 15 feet in height, and continues for 13 miles to Ukko village, separating throughout that space the sea from the great salt-water lagoon and swamps which are produced by the overflowing of the Volta. From the masthead the whole face of the country appears a wooded morass as far as the eye can see; and the surface of the lagoon is broken by large tracts of swamps, some of which are covered with grass, and others by jungle, with here and there a few high trees.

Ukko.—The village of Ukko is about 250 yards from the beach, near the eastern extremity of the lagoon, and surrounded by cocoanut trees, which, as there are no others near it on either side, give it the appearance of an island when seen from a distance. At ¼ mile eastward of Ukko, the shore though intersected by swamps, is again covered with verdure, and thick groves of palm trees mixed with jungle, which extend to the banks of the Volta. There appeared to be other villages in the bush, as well as on the beach.

Beach town, about 1¾ miles westward of the entrance to the Volta river, is a native village with a few European merchants' houses; the village, built in a hollow, is easily recognized by the mission house, a flat-roofed building standing on the western extremity of the settlement.

Anchorage.—There is fair anchorage off Beach town in 6½ or 7 fathoms sand, with Basle mission house (a long white building on the beach) bearing N. 17° W. (north mag.). It is not prudent to anchor nearer the shore as the water shoals quickly and at times the swell is heavy. The landing is very bad, the surf boatmen often refusing to go out. The mail steamers call occasionally to ship palm oil, but the treachery of the natives should be guarded against.

Volta river.—This river is said to come from a long distance in the interior, and separating the great kingdoms of Ashanti and Dahomey, passes near the base of Ningo Grande peak, on the north side, at 45 miles from the sea; from thence it takes a southeasterly direction toward the coast, and enters the sea between two low spits of sand, 18 miles westward of cape St. Paul.

Immediately within the two entrance spits the river expands into a wide basin, both banks of which are covered with mangroves to the water's edge. Immediately north of Richards point, the Volta is joined by the outlet of the great eastern lagoon; and above this junction a group of partially wooded islands, named Kennedy islands, occupies the middle of the reach. On the eastern bank, about a mile north of the entrance points, there is a dark grove, which makes like a bluff headland; at 2 miles to the eastward of this grove there is another in the form of a conical hill, and on the western side of the river there are three other high groves, the trees in the immediate neighborhood of Volta river attaining an unusual height.

The river begins to rise early in June and commences to fall about the middle of October. In December, 1887, the gray waters of the Volta extended to the extremity of cape St. Paul, where they suddenly ceased.

Adda is a large town on the right bank of the Volta, about 6 miles from its mouth, and near it is the fort of Kongensteen.

Riverside.—The principal merchants reside at a town locally known as Riverside, on the right bank of the Volta, at 1¾ miles within the western entrance; the produce brought down the river is landed at Riverside and conveyed across to Beach town, on the seacoast, for shipment.

Foa is on the bank of the river close to Riverside, and is marked by a large clump of palm trees.

Riverside, Foa, and Beach town, are collectively known as Adda-Foa.

Entrance.—When coming from the westward, the mouth of the river is known by a temple and large building of two stories, which is also seen from the east, but is then on certain bearings hidden by the tall cocoanut trees. The mouth of the river is clearly seen when bearing NW. by W. Dolben point, the western spit is 1½ miles in length. Richards point is 800 yards north of Dolben point, and between them is the entrance of the river. Half mile westward of Dolben point, there is a separate clump of trees which appears as an island when the point bears NNW. In October, 1889, 10 fathoms of water were found at 6 miles off the mouth of the river.

Bar.—The bar sweeps round in a semicircle before the entrance of the river, from Dolben point to Sandy island, that adjoins the shore one mile SE. of Richards point; the surf on it is generally too heavy for boats to cross. A depth of from 19 to 21 feet was found on the bar at one hour before high water, when examined in 1884.

Caution.—No vessel should attempt to cross the bar, which is constantly shifting, except in fine weather, and with the assistance of a pilot, as there are now neither buoys nor leading marks.

When passing the entrance of Volta river, allowance should be made for the indraught on the flood; the soundings should not be reduced to less than 12 fathoms, as in 10 fathoms a vessel would almost be within the influence of the breakers.

Tides.—It is high water, full and change, at Riverside, at 4h. 20m.; springs rise 4 feet in June. At the mouth of the river (in February) springs rise from 5 to 6 feet, neaps 3 feet.

The range of tide is affected by the state of the river; when at its lowest (about March) the range at springs is sometimes as much as 6 feet, as the river rises the strength of the stream increases, and the tides have not so much effect; when at its highest (in September and October) the range at Riverside is reduced to one foot or less.

Upper river.—At Amidika, 50 miles within the entrance, and where the stream is ½ mile wide, the difference of level between the high and low

state of the river is about 45 feet; at the entrance, owing to the large expanse over which the waters spread, the difference is not more than 4 or 5 feet.

A vessel drawing 6 feet water can ascend to Amidika from July until November; during the remainder of the year a vessel of that draft would experience difficulty in proceeding to Duffoa island (40 miles within the entrance), and could not ascend above that point.

Coast.—From the mouth of Volta river the shore, which continues to be a straight clean beach, takes an easterly direction, and for a distance of 7 miles the land is covered with a dense forest, principally of fan palms.

Atoku.—The town of Atoku was once a notorious slave mart; it is 8 miles east of Volta river, and ½ mile from the beach. There is a kind of gap in the uniform line of forest at Atoku where there are a few straggling trees.

Current.—The general current between Cape Coast and cape St. Paul sets toward the ENE., with a mean rate of $\frac{6}{10}$ to $\frac{8}{10}$ of a mile an hour, which is less than its rate on the meridian of cape Three Points. Between Cape Coast and the meridian of the Volta the force of the current increases in proportion to the distance from the land; 20 miles from the land off Accra its rate is from $1\frac{5}{10}$ to $1\frac{8}{10}$ miles an hour, whilst at 10 miles from the same shore it is only $\frac{6}{10}$ or $\frac{7}{10}$. On the meridian of the Volta, at 12 miles from the land, the current generally flows NE., with a force of $\frac{8}{10}$ of a mile an hour. Near cape St. Paul its direction varies a little, setting sometimes NE. and sometimes ENE., but rarely exceeding a rate of $\frac{7}{10}$ to one mile an hour.

In the harmattan season, from December to February, on all this coast, the Guinea current is very weak near the shore, and oftentimes a westerly current is found. The strong tornadoes produce the same effect. This westerly current, which has been verified by frequent observations, may be useful to vessels trying to make westing along the coast.

Seasons.—The seasons on the coast just described follow the same general laws as farther to the westward. At the end of October the rains generally commence by mild squalls from the NE., and continue during the month of November and the first half of December. The sea breezes are then the most frequently interrupted. The humidity at night is excessive. The NE. winds prevail as well as the land breezes. This season is very unhealthy. During the last half of December the temperature rises sensibly. Winds from the west and WSW. are fresher and better established, and the land and sea breezes alternate. In January and February the sea breeze prevails, occasionally interrupted, however, by the harmattan from the eastward, chiefly in January and February, lasting, sometimes, several days. This latter is ordinarily mild, less fresh than the sea breeze and fresher than that from the land. The temperature is high at

this season; in February and March the thermometer, in the shade, reaches 86° two hours after noon. This is also the season when the surf is least violent along the coast, and landing more readily accomplished.

Toward the latter half of March the weather becomes stormy. Squalls from NE. commence in the interior, and announce the season of heavy rains, which begin on the coast at the end of this month. The tornadoes are violent in April, May, and June. The rains fall in abundance, especially in May and until the early part of June. There is little or no breeze from the land at this season, and the heat is stifling. The rivers increase at this time, and in June reach their highest elevation. They commence to fall in August. In July the rains are more drizzling; the sky is generally overcast and moderates the heat of the sun; the temperature falls to 68° and fogs are frequent. The tornadoes cease as a rule in June, though an occasional one occurs as late as August. During this month the sea breeze is from the SW. and WSW., and sometimes quite fresh. The surf at this time is the most violent, and for 12 or 15 days at a time is impassable. The swell that is experienced at the anchorages is equally extremely wearisome. In September the weather becomes more pleasant; frequent calms occur, interrupted by light airs from the south and SSW.; the temperature rises, and sometimes toward the early part of October there are mild showers.

In July, August, and September the fogs are especially thick, and the lands on the Gold coast extremely difficult to recognize. The same may be said of December, January, and February.

The regularity of the plateau of soundings renders navigation easy on the coast between capes Palmas and St. Paul, since confidence can be placed in the indications furnished by the lead, and vessels can anchor almost anywhere. Vessels should therefore keep near the coast, for if they pass to the eastward of the point they wish to reach, it may take many days to work their way back against the general current.

CHAPTER IX.

CAPE ST. PAUL TO CAPE FORMOSO. THE BIGHT OF BENIN.

Cape St. Paul.—From Atoku the coast line bends gradually to the northward, toward cape St. Paul; at 3 miles farther east, the coast having turned more to the northward, is the village of Weh, which is difficult to be seen. The curve of the shore being so gentle, it is difficult to say what part of it should be named cape St. Paul; that name is, however, usually applied to the coast near Weh in longitude 58′ 30″ E.

From Atoku to Quitta, or in other words the whole sea face of cape St. Paul, is only a narrow ridge or barrier of sand, which separates the sea from that great eastern lagoon, already mentioned as being connected with the Volta river, receiving its overflowing water, and extending to the eastward for many miles. On this narrow strip of sand stands several native towns.

Weh.—At this village canoe communication may be had with the shore, and plenty of stock obtained. It may be known by a fan-like cluster of trees, with a remarkable clump of trees, named Tegbeh, situated 2 miles to the northward and ¾ mile inland.

Soundings.—With cape St. Paul bearing NW. the bank of soundings to the 100-fathom line extends 7 miles from the land; and in the meridian of these trees it is very flat, dropping suddenly, at a distance of 9 miles, from 22 to 200 fathoms.

Anchorage.—Vessels desirous of communicating with the shore at Weh may anchor at any required distance from it, as there are no offlying dangers. The soundings are regular, with the bottom of fine white sand near the beach, and mixed with shells and mud farther out.

Jella Koffi, or Jellu-kofi, 3 miles northward of cape St. Paul, or midway between that cape and Kitta, when made from the eastward, appears as several islands, the western of them being the clump of trees among which the huts and houses are built. When approached from the westward, the first white house seen, after rounding cape St. Paul, will indicate the place off which to anchor. A large vessel might anchor in 6¾ fathoms, sand, with Kitta fort bearing N. 12° W. (N. 5° E. mag.), and Jella Koffi flagstaff bearing N. 85° W. (N. 68° W. mag.).

Caution.—At night care should be taken not to mistake the lights in two or three houses a mile northward of Jella Koffi for those of the village.

Supplies.—Cattle are abundant in the vicinity of cape St. Paul, and may be procured without difficulty from the natives at Weh, Jella Koffi, and Kitta. The cattle are small and cost about $20 delivered on board.

Landing.—The surf is much too high along the beach to employ ordinary boats for this purpose. At Kitta the landing is easy at times.

The naval contractor lives at Jella Koffi. The station near which he resides is situated about 2 miles south of Kitta fort; it consists of two white houses and a flagstaff.

Kitta.—From Jella Koffi the shore trends about north for 2¾ miles to Kitta, a place identified by its white fort and clumps of trees; it stands ¼ mile from the beach. From Kitta to White house there is a mile of beach almost clear of trees; similarly for a mile to westward it is pretty clear of trees. About 50 huts lie on the southern side of the fort, and the edge of the lagoon is within 350 yards of it to the northwestward. The natives at Kitta are extremely civil and assiduously meet every demand for refreshments.

There are several narrow streets with little picketed inclosures, and some appear to be neatly kept. Both the town and fort are concealed when southward of them by a large grove of lofty cocoanut trees.

Several white factories are situated close to the south side of the fort.

Communication.—Mail steamers leave Liverpool every Saturday and Hamburg once a month for the Gold coast.

Anchorage.—To facilitate communication with Kitta a vessel should anchor as close in as ½ mile from the shore in 7 fathoms; otherwise in 10 fathoms at 2 miles off, with the fort bearing N. 62° W. (N. 45° W. mag.). The 100-fathom line of soundings lies 9 miles off Kitta on a S. 40° E. (S. 23° E. mag.) bearing, the soundings abruptly dropping from 38 fathoms, black mud, to 108 fathoms.

Caution.—It must be borne in mind while at anchor at Kitta or on this part of the coast that the tornado often blows on shore. Vessels intending to stay should not anchor in less than 6 fathoms, as rollers may come in suddenly.

Country.—From Kitta the banks of the lagoon previously described as being connected with the Volta river are seen extending to the eastward, and the country on the northern side is described by the natives as being very productive. The inhabitants of the long intervening ridge, between the lagoon and the ocean, derive all their supplies of provisions from thence, which occasions a considerable canoe traffic between the opposite shores.

Coast.—From Kitta the coast line trends in a straight line NE. by N. for 8½ miles to Elmina Chica, with, like the shore previously described, clean ground in 6 fathoms, at ½ mile from the surf. The villages of Akwiji and Blukus are among large clumps of trees at 3 and 4½ miles respectively NE. of Kitta.

The coast for 100 miles between Kitta and Porto Novo is low and flat, presenting to the view a line of green brushwood, with occasional large

clumps of palm trees and a yellow sandy beach on which the surf breaks heavily.

Elmina Chica.—From Blukus the coast trends NE. by N. for 4 miles to the former slave station of Elmina Chica, where there is one large white factory, a group of huts, and a high clump of trees, which help to mark its position.

Addafia.—From Elmina Chica the coast, with the same general appearance, bends gently eastward for 5 miles to a village on the beach, known as Addafia, where there is a single white house nearly hidden among the trees which serves to distinguish it from the next coast village, which is named Dano. Neither at Elmina Chica nor at the intermediate places between it and Kitta, will the signal for a canoe be attended to with any certainty.

Soundings.—Between Addafia and Kitta, a depth of 8 fathoms, over fine brown sand, is found at ½ mile off shore, and the 100-fathom line is 13 miles distant, dropping abruptly from 43 fathoms, black mud. Patches of gulf weed may be seen in this vicinity drifting to the eastward.

Dano, about 1½ miles eastward of Addafia, has four white houses, the most prominent being the German factory; a Government house has been built behind some trees; there is also a customhouse; each of these establishments has a flagstaff.

Aflao, known as Porura, where there are three white houses and a store with a red roof, and both English and German trading stations, is about 4 miles eastward of Dano.

Boundary.—A few huts near the beach serve to mark the boundary between the English and German protectorates. A flagstaff has been placed to mark the boundary; its approximate position is in latitude 6° 5′ 42″ N., and longitude 1° 14′ E.

German protectorate.—All the places under the protectorate hoist the German flag, and the flagstaffs are painted in alternate bands of black and white.

Beh beach, or Lomeh, about 3 miles eastward of Aflao, is a rising place, having several English and German factories, as well as being the residence of the German commissioner. All English steamers call here.

Porto Seguro.—From Dano the beach is nearly straight for 26 miles in the direction of ENE. ¾ E. to Little Popo, the trading port of Bagdad, which lies about midway between them; a range of bushy sand hills, with tall isolated trees a mile apart, and with 7 fathoms, dark sand, at ½ mile from the shore, extends 18 miles east of Dano. At 3 miles farther east, just within high-water mark, is the village named Gomaluta or Porto Seguro, on the east side of which is a white house with a red roof, and on the west side a red roofed house with a flagstaff close to it. These are the only buildings which are conspicuous from seaward.

Lagoon.—The lagoon at the back of the beach between Addafia and Porto Seguro extends east and west, but shoals, narrows, or long windings make it useless even for canoes.

Supplies.—On this part of the coast, Jella Koffi is considered the best place for poultry, Addafia and Porto Seguro for sheep, and Little Popo for fish, vegetables, and fruit. The English packets frequently call at Agweh for supplies.

Anchorage may be had at one mile S. 17° E. (south mag.) of the eastern extremity of the bush at Porto Seguro in 10 fathoms.

Little Popo.—At about 2 miles east of Porto Seguro there is a clump of trees and the village of Fishtown, and at 7 miles E. by N. of Porto Seguro, Little Popo presents an imposing front of beach storehouses and signal poles, one of which marks the residence of the native chief. A creek of the lagoon comes in an oblique direction from the NE. to within 120 yards of the sea beach, dividing the town (which is ¼ mile inland) from the whitewashed storehouses and dwellings that range along the high-water mark for the space of a mile, so that to proceed to the town, either the head of the bight must be rounded, or the creek, which is 14 feet deep and 300 yards wide, must be crossed.

Little Popo is rendered conspicuous by two large white two-storied factories, and may be readily distinguished from Porto Seguro and Agweh from its being situated on a strip of beach, almost entirely free from trees, except at its western part, where there is a remarkably thick palm wood, in which is the native town.

It may also be known by the extensive clumps of inland trees near it.

Little Popo is one of the principal calling places of the mail steam packets.

Landing is bad in the rainy season, there being two lines of surf to pass through.

Anchorage.—A convenient berth for anchoring may be taken with the eastern extreme of the stores on the beach bearing north (N. 17° E. mag.) in 8 fathoms, fine sand, about a mile off the heavy surf.

Caution.—A night should not be passed closer in than a mile from the shore, and even at that distance, on any part of this coast, a second anchor should be ready in case of a roller snapping the cable when there is no land breeze.

Soundings.—The 100-fathom line lies 15 miles off Little Popo in a SE. direction, the depth increasing suddenly from 48 fathoms, black mud, to more than 200 fathoms.

Current.—The gulf weed is swept in by the swell to within a mile of the shore, and lies obliquely to the set of the current, which is to the eastward, except in the harmattan season.

Agweh.—From Little Popo, the coasts trends E. by N. for 4 miles to another native village named Agweh. A church with a square steeple well marks this village.

Anchorage may be had in 10¼ fathoms at 2 miles off Agweh with Little Popo bearing N. 65° W. (N. 48° W. mag.), and Agweh bearing N. 6° E. (N. 23° E. mag.).

Bae.—At about 8½ miles east of Agweh there is one long native-built shed and a few huts but no European houses.

Great Popo.—The shore for 11 miles east of Agweh is bushy, with scattered palm trees, as far as Great Popo, eastward of which the sand ridge is broken through by the occasional outfall of the lagoon.

Several dark dome-shaped trees, situated 2 or 3 miles eastward of Agweh, are the most conspicuous objects on this part of the coast when seen from a distance of 7 or 8 miles in the offing.

There are several factories at Great Popo, but they are not conspicuous from the offing, the town lying at the back of the sand ridge. An elevation of the ground, rising to the height of about 200 feet, and surmounted by a few trees, stands 6 miles to the eastward, and is commonly known as mount Pulloi or mount Palaver.

The outlet of the lagoon in January, 1877, was about midway between Great Popo and mount Pulloi; the channel lay in a NW. and SE. direction, and for a distance of 2 miles off shore the water was much discolored.

Great Popo may be readily distinguished, when near, by two long white flat-roofed houses on the beach, one on either side of a white house with a gable roof; there are also two stores with red roof a short distance westward of the station.

Whyda.—The coast continues from Great Popo for 11 miles in the same direction resumes its former appearance as far as the next principal trading station, the seaport of Whyda. This place lies 8 miles eastward of mount Pulloi; it may be known when 3 miles to the westward of it by two dark clumps of trees, named the Brothers, and when made from the southwestward two white factories are conspicuous. The beach station of Whyda presents to the view from seaward half a dozen storehouses, sheds, and huts, all of which, when on a northerly bearing, make out clear of the western fall of a high grove of trees in the background. In the center of the town on the beach there is a dark-colored house with a white roof and a flagstaff near it. The lagoon town of Whyda lies 3 miles from its seaport, on the northern shore of the lagoon which here approaches to within ½ mile of the beach, is only ¼ mile wide and 4 feet deep. The lagoon town is built on slightly rising ground, and is estimated to contain a population of about 12,000.

Supplies of live stock, vegetables, fruit, and, if desired, small casks of water can be obtained here; the surf is heavier than to the westward.

Whyda climate is considered to be more liable to intermittent fever than the other towns on this windward arm of the bight of Benin.

Communication.—There is a weekly mail service with England, carried on alternately by the African Steamship company and British and African Steam Navigation company.

Anchorage, convenient for communication with the shore, can be obtained one mile off Whyda in 7 fathoms, in good holding ground, with the highest storehouse bearing N. 17° W. (north mag.). The 100-fathom line lies 12 miles from the shore, the soundings dropping into deep water from 48 fathoms, black mud, with 13 fathoms midway between that depth and the coast. The discharge of the freshets at Great Popo gives a greenish tint to the sea that sometimes extends to this place.

Current.—Between Cape Coast and Whyda, during July and August, the current has been observed to be irregular, both in strength and direction, setting to the westward occasionally with a velocity of half a knot an hour.

Gadomi, or Jackin.—The coast extends eastward for 10 miles in a direct line from Whyda to Jackin which slightly projects. There are three solitary palms on the shore about 3 miles to the westward of Jackin, at a distance of about ½ mile apart. A solitary white house, 6 miles east of Whyda, is also conspicuous. No huts or canoes are visible from the offing. At Jackin, there are four houses and two flagstaffs. The village extends above ½ mile along the beach.

Banks.—A shoal of 5½ fathoms lies S. 6° E. (S. 11° W. mag.) of Jackin, distant one mile, and at about 2½ miles south of Jackin the existence of a bank on which the least water found was 6¾ fathoms, has been reported.

From the eastern edge of this bank the lone tree bears N. 12° W. (N. 5° E. mag.).

Kotonu, or Appi.—With a gentle bend to the northward the same character of coast continues 10 miles eastward of Jackin to Kotonu, which may be recognized by a vista through the flat jungle on the shore, which opens on the bearing of north (N. 17° E. mag.). The 100-fathom line recedes here to 17 miles from the beach, the depth increasing suddenly from 66 fathoms, black mud, to more than 200 fathoms.

Kotonu is a larger village than Gadomi, and there are generally several vessels loading with palm oil here, while at Gadomi (Jackin) there is seldom more than one vessel at a time.

At Kotonu there were in 1888 three conspicuous factories.

The telegraph cables from St. Thomas and Accra are both landed here.

Pier.—A pier is in course of construction at Kotonu, which will extend about 312 yards seaward, at right angles to the beach; in February, 1892,

a length of about 109 yards had been reached, and it was being lengthened about 26 yards a week.

About March 10, or when the extremity of the pier would be beyond the line of breakers, it was intended to exhibit a fixed red light, visible in clear weather about 3 miles from the outer end; and which light will be moved seaward as the pier is extended.

NOTE.—On the completion of the pier, this provisional light will be replaced by a light of similar character, elevated about 31 feet above high water, and shown from an iron staff about 20 feet high. The red color of the light serves to distinguish it from other lights in the vicinity.

Telegraph.—Kotonu is in telegraphic communication with Accra and St. Thomé.

Porto Novo.—At 9 miles eastward of Kotonu, with two small villages intervening, is situated the next trading station, which is the landing place the town of Porto Novo, at the eastern part of Porto Novo lagoon, 10 of miles NE. from the landing place on the coast, and 50 miles westward of Lagos. Porto Novo is in French territory.

The trading station can be recognized on western side by two houses with red roofs, and between them a white house with a flagstaff; and on the eastern side by a single white house.

Anchorage.—There is good anchorage in 8 fathoms, sand and mud, at 2 miles S. 6° E. (S. 11° W. mag.) of the station, and the 100-fathom line of soundings is 16 miles from the coast on that bearing, the soundings deepening abruptly.

Coast.—With the same description of foreground, but with continuous groves of high trees in the distance, and occasional clumps in the intervening plain, the coast is nearly straight from Porto Novo for 18 miles in an easterly direction to the landing place of Badagri. From a vessel only two or three white huts can be seen, and these only in a NW. direction. There is a pyramidal clump of bushy trees immediately to the eastward, known as mount Badagri; there are also two saddle-shaped clumps of trees and two groups of huts at 3 and 6 miles to the westward of Badagri.

Badagri, containing a population of 15,000, is on the north side of Victoria lagoon, 33 miles westward of Lagos, and a mile from the landing place, out of sight of either the anchorage or beach.

Anchorage.—Convenient anchorage may be obtained off Badagri in 8 fathoms, mud and shells, with the white huts bearing N. 6° W. (N. 11° E. mag.), distant about a mile. The signal for a canoe will be promptly answered here, and every attention paid to applications for supplies.

Zuzu.—The coast line eastward of Badagri presents the same appearance as that to the westward, and has similar soundings off it for a distance of 9 miles to Zuzu, which may be recognized by a grove in the back-

ground, surmounted by two umbrella-shaped palm trees, also by a remarkable red house.

On the coast between Badagri and Zuzu is one village, and some rows of salt pans will also be seen.

Coast.—From Zuzu the coast line trends about east, gently curving both in and out for 24 miles to the opening of Lagos river.

The western half of the distance from Zuzu to Lagos is very flat and bare, having but few trees and no huts upon it; but the eastern half shows a densely wooded background that rises from the margin of the lagoon.

The two low, bushy, and sandy points at the entrance of Lagos river, with woods in the distance, two clumps of trees somewhat inland at 4 and at 5 miles eastward of the entrance, the single palm, situated 1½ miles east of the entrance, and the flagstaffs on the eastern entrance point, form the distinguishing features of the coast in the immediate vicinity of Lagos river.

At about 12 miles west of Lagos river there is a conspicuous high knoll, and at 3 miles west of that river, close to the beach, there is a large white house which makes a good landmark.

Sanitarium.—The government sanitarium is on the western shore near Beecroft point, at about 1½ miles to the SW. of Bruce beacon where the coast begins to trend toward the entrance of the river.

Lagos river is the first permanent break in the coast line to the eastward of cape St. Paul, and through it the periodic accumulation of the freshets in the lagoons finds a vent to the sea, occasioning a surf of no ordinary kind upon the bar.

The river is situated at the southern part of the extensive lagoon known as Lagos lagoon, and the principal channel passes west of Eko or Lagos island.

Entrance.—The entrance to the river is between Bruce point on the western side and Greslie point, the eastern entrance point, a low sandy continuation of the mainland, on the eastern part of which is Victoria settlement and signal station.

Lagos.—On the western side of Lagos island there is an important settlement, at which there are numerous factories and several conspicuous houses with red roofs; at the settlement there are several wharves, affording facilities for loading and unloading cargo.

The town, the largest on the west coast, is about 4 miles north of Lagos bar.

The colonial government hospital will treat seamen at a fixed rate of payment.

Population.—In 1887 the population of Lagos island numbered about 40,000.

Supplies.—The well water at Lagos is very good, the best being obtained on the mainland, opposite the church. Provisions of all kinds are abundant.

Coal is supplied in flats that carry about 4 tons. There is usually about 1,000 tons in stock. Any vessel able to cross the bar can coal alongside a wharf.

Repairs.—A workshop, in which small repairs can be effected, is in course of construction (1887). A patent slip for vessels not exceeding 500 tons is contemplated.

Communication by steam every week with Liverpool and ports on the Gold coast and SW. coast of Africa, once a month with Hamburg, and frequent communication with the United States and Brazil by sailing vessels.

Local steamers of light draft ply by inland waters with Porto Novo.

Telegraph.—Lagos is connected by telegraph with the Gold coast, Sierra Leone, and Europe, and with Kotonu, Gaboon, and Loanda via Accra; also with the Niger, Bonny, and Brass rivers direct.

Quarantine.—There is a quarantine ordinance which may be put in force if occasion requires it.

Beacon and buoy.—There is a beacon on Bruce point. A buoy (black in 1889) lies in 7 fathoms and is used as a fairway buoy.

Light.—A circular red brick lighthouse has been built near the western entrance point of the river 300 feet westward of the sanitarium. From this lighthouse a fixed white light is shown at an elevation of 86 feet and visible 15 miles between the bearings N. 79° E. (S. 85° E. mag.) through north to S. 89° W. (N. 75° W. mag.).

Tides.—It is high water, full and change, at Lagos bar at 5h.; springs rise 3 feet.

The ebb stream makes down the river beneath the surface about 3 hours before the stream on the surface turns. The flood stream makes, but is not perceptible till within an hour or an hour and a half of high water; then it runs with great rapidity, as much as a boat can pull against. Within the river the rise of tide in the fine season is not more than one foot; during the rains the river is said to be swollen nearly 3 feet. When the ebb stream makes, the rush is so great that large masses of the banks are swept away, sometimes carrying men and cattle with them.

Current.—Between Badagri and Lagos the current has been observed to have a set toward the shore.

Outer anchorage.—Merchant vessels anchor in 7½ fathoms, with the entrance of the river open. Vessels of war anchor in 10 fathoms, with Beach house and government flagstaff in line; or a good berth is in 5 or 6 fathoms, at 1¾ miles off shore, with the center of the town and Victoria about NW.; here a vessel will be out of the stream of the river and ride

head on to the heavy swell that always rolls into Lagos roads, and which renders it an uncomfortable, if not dangerous, anchorage.

Vessels approaching the anchorage should not anchor westward of the fairway buoy, so as to avoid fouling the cable which is laid about a mile SW. of the buoy.

Two cables are landed near the brick works southeastward of Lagos; they are laid on the eastern side of the river till below Wilmot point, thence across the bar in a SSW. direction seaward; at the distance of 2 miles from the bar the cables separate, one trending gradually southeastward to Brass river, the other westward to Accra.

Signals.—A small steamer is sent out to any vessel of war firing a gun and hoisting a red ensign.

If wishing to communicate, such intention should be made known by international code to signal station on beach, giving name of ship, and the river steamers stationed in outer anchorage which fly the signal P should also be informed.

The following bar signals (commercial code) are shown from a flagstaff near to the tide gauge, which is under the supervision of the beach signalman on the eastern entrance point:

Commencement of rise: N flag hoisted half mast.

High water: N flag mast headed and kept there until the water begins to fall.

For bar boats { Smooth bar.....Flag S.
Bad bar.....Flag B.

Rollers.—The rollers are heaviest from June to August.

Bar.—At 2 miles outside the mouth of the river the bar breakers extend for nearly 1½ miles in a southeasterly direction from the government sanitarium.

The intermediate space to the NE. from the bar breakers to the entrance is occupied by detached banks and breakers, having channels between them.

The entire breadth of the channel at the entrance is ½ mile, and through it the lagoon pours out, about half ebb, such a volume of surface scum of a deep-brown tint and of a sickening odor as to spread to a distance of 3 miles from the coast; the edge of this discolored water is marked by a well-defined margin as it rolls forward on the deep blue water of the offing.

During the rainy season the discoloration of water produced by the discharge from Lagos lagoon is perceptible when at a distance of from 7 to 10 miles eastward of Lagos.

At all times there is a break across the bar, being worst during the rainy season (June–September), when sometimes steamers can not cross. The bar is very treacherous in its shifting; the depth is also variable, altering as much as a foot in two or three days. A plan of the bar is kept at the harbor master's office for inspection during office hours.

Greatest draft.—In 1887 the limit of draft over the bar was 12 feet for steamers and 11 feet 6 inches for sailing vessels. No vessel should attempt to cross without a local pilot, although the channel is buoyed. The harbor master pilots all English war vessels in. There are 6 small-powered steamers that ply over the bar.

From the dangerous nature of the bar at Lagos river entrance, only the English and German river steamers should be used for landing.

Rules for navigating Lagos river.—In thick or foggy weather, every steamer proceeding outwards will give one blast of the steam whistle at intervals. Every steamer entering the port will give two blasts at intervals.

In all cases where two or more steam or sailing vessels are making for the bar, the vessel or vessels being bound for the port being at or near the Fairway buoy shall stop and allow the outward bound vessel or vessels to proceed if such outward bound vessel or vessels is, or are, between the beacon on Bruce point and the bar; when such outward bound vessel or vessels shall be on the Lagos side of such beacon and the inward bound vessel or vessels at or near the Fairway buoy, then such outward bound vessel shall stop and allow the inward vessel or vessels to proceed.

Directions.—No definite directions can be given, as the best channel over the bar is constantly changing. A pilot should always be taken.

Anchorage may be obtained abreast the town of Lagos in 12 to 20 feet.

Boat entrance.—Should it be desirable to enter the river in a boat, a suitable opportunity must be waited for; this will be soon apparent (in the fine season) by the inner part of the middle spit becoming dry; then wait till it is nearly covered again, when it will be certain that the flood is making, when pull through the Eastern passage, keeping just outside the rollers and close to the beach, passing within a few yards of Greslie point. This is the best and only safe passage that can be constantly used by boats (tide permitting) throughout the year.

The western passage is only available for boats and canoes during the dry season or in very fine weather. When the sea breeze blows strongly, the sea breaks right across it.

Soundings.—South of Lagos bar, the 100-fathom line of sounding lies 19 miles from the shore, the depth increasing suddenly from 70 fathoms, black mud, to more than 200 fathoms; a depth of 29 fathoms and an occasional overfall at 9½ miles from the coast. The 10-fathom line approaches within 2 miles of the shore.

Quoin village.—The coast immediately eastward of Lagos resumes its usual characteristics. A native village lies at 7 miles distance to the eastward, and from its relative position with respect to the quoin-shaped

clump of trees lying 1¾ miles NW. of it, is named Quoin village, or Okun Beju.

Jackna.—From Quoin village the shore trending to the eastward is nearly straight, and presents nothing to view but a ridge of dense jungle for 12 miles, at which distance from the village there is a group of palm trees resembling in shape a fan, and then several isolated trees, with one village, 6 miles eastward of which is situated Jackna, a place showing but half a dozen huts in a grove of palms. Jackna is the northernmost part of the bight of Benin, the windward arm of which begins there to recede to the southward, and trends eastward for a distance of 6 miles, to Palma village.

Between Jackna and Palma there are two small villages.

Palma.—This village may be identified by five huts with palm trees at equal distances apart, situated at the eastern gables of each of the four eastern huts, and by three remarkable palm trees at ¼ mile eastward of the village, the middle tree being about half the height of the other two, and the whole group standing out in strong relief.

Avons deep.—The regularity in the bank of soundings, at 30 miles east of Lagos and south of Palma village, is interrupted by a remarkable submarine feature known as Avons deep, in which the depth of water suddenly increases at the outer part from 70 fathoms to more than 200 fathoms, and at the inner part from 40 fathoms to more than 200 fathoms.

The center of this remarkable submarine valley is situated in latitude 6° 10′ N., longitude 4° E., at which position the 100-fathom margins of the bank of soundings are 8 miles apart, and from whence the deep water trends about NNW. for 10 miles, the 100-fathom edge of soundings on either side gradually approaching each other.

The northern part of Avons deep is about 7 miles from the shore, bearing south from the village of Palma.

There is no overfall, nor anything on the surface to indicate the existence of this singular conformation at the bottom; nor is there any opening in the adjacent coast, or any apparent change in its character. The prudent navigator, however, should be upon his guard when in its neighborhood, for if approaching the shore at nightfall, or in hazy weather, in dependence on the lead, and intending to be close in at daylight, he might be fatally deceived by a cast with no bottom in this deep, imagining his vessel outside the bank, instead of within 6 or 7 miles of the beach. In some cases, however, this deep, like the Bottomless pit, may be of material service to the seaman at night, by giving him a fresh departure.

Lekki lagoon is a shallow sheet of water several miles in extent. It is connected with the town of Epeh at the eastern end of Kradu water by a channel 9 miles long. The town of Lekki is in the southern part of the lagoon. From Lekki the inland water communication extends through creeks far to the eastward.

Coast.—From Palma village the general direction of the coast line is E. by S. for 36 miles to the termination of the sandy beach; the western 21 miles showing a dark undulating bushy foreground, and a distant and paler colored background of trees, which afford a striking contrast. The next 9 miles of coast is very flat, though bushy, and with no groves in the background; the remaining 6 miles has the back as well as foreground features. Mobido village with four huts is situated on the shore, 3 miles eastward of Palma; a single hut stands 4 miles farther east; and at 3 miles beyond that, and altogether 10 miles east of Palma, is situated the western of three remarkable vistas, with a village and group of palm trees, named Shoroko at the entrance of Lekki vista. These vistas, or lagoon entrances, lie 5 and 12 miles apart, and appear open only when abreast of them; they are each about ¼ mile wide at the beach, and they cross the island of Kuramo at right angles.

There is a native village at 5 miles from Shoroko, then the entrance to Otolu vista at one mile farther. Ikegu village, where there is a flagstaff, lies 2¼ miles east of Otolu vista, and from thence the sandy beach on which are a few huts, extends 10 miles to Odi vista (Ajimo), the eastern of the three.

At 5 miles eastward of Odi vista stands a village, with its two conspicuous palm trees; and ¼ mile farther east an abrupt and remarkable change occurs in the nature of the coast, from sand to mud, the dry soil, palm trees, and brushwood being succeeded by swamps and mangroves. With the alteration in the character of the coast its direction also changes to the southward, and flats of 5 fathoms extend 5 miles off shore. This termination of the sandy beach is a striking feature in the navigation of the bight of Benin. Thus far a vessel approaching from the westward may fearlessly run along the coast at the distance of a mile, except at the projecting bar of Lagos river, but after passing Odi vista, muddy shallows of 3 or 4 fathoms in depth will be found within 2½ miles of the shore.

The coast for 6 miles SE. of Odi village is a mud flat; no background trees give effect to those that are scattered along the margin of the sea, and the surf which breaks fully a mile off shore is no longer heard. At the southern extreme of this mud flat, two little openings into the lagoon like vistas may be observed; the shore then assumes a somewhat firmer character, and is interspersed with clumps of trees and scattered huts as far as the group of villages named Town; whence to Benin river the coast line is slightly concave, but its general trend is SE. for 27 miles.

Delta of Niger river.—At Benin river the delta of the Niger may be considered to commence, extending in a southeasterly direction for about 120 miles to the most frequented mouth, known as the Nun entrance. The part of the delta between the Forcados river and the Niger is almost unknown.

From Nun entrance the coast of the delta trends in an easterly direction for about 140 miles to Old Kalaba (Calabar) river.

These streams which flow through the delta are locally known as the Palm Oil rivers.

Benin river.—The entrance to this river is difficult to distinguish from seaward; the northern entrance point (North point), 100 miles ESE. of Lagos bar, forms a well-defined elbow, while on the southern side there is only a gentle curve, particularly difficult to recognize when bearing NNE.; from abreast of North point the opposite shores take a parallel direction for 4 miles, and are 1½ miles apart; both sides are flat and swampy, but inhabited.

The Benin is connected with Escravos river by two waterways. The lower is known as Dali (Deli) creek, the opening of which is on the left bank about 6 miles up the river. Nanna creek is the upper one.

H. M. S. *Alecto* steamed up the river for about 80 miles until stopped by its narrowness and sharp turns. At 30 miles up there is a branch from the left bank; this branch probably carries the greater part of the trade between the factories and the inland markets. About 20 miles above this branch is a good road to Benin, a large and important city. The river was deep, probably not less than 3 fathoms, clear and without dangers; a large rock, marked by weeds, obstructs the passage a little below where the *Alecto* stopped, but there is room for a larger vessel than the *Alecto* to pass. Above the rock the river narrows rapidly. The temperature was cooler than at the mouth, and there were no mosquitoes.

Trade.—There is a trade from this river in palm oil and ivory. Five factories are situated on the north shore below Lagos creek, and two above the creek. The busy season is from April to July.

Battery point.—This point is 4 miles within the entrance on the eastern side. A small island lies off the point, and is connected to the point by a sand bank.

Villages.—There are three villages on the north shore of Benin river, the outermost of which, 1⅓ miles from the entrance, is known as Fish town.

Booby town (Obobi) and Salt town are two villages on the south shore, the former being 1¼ miles SW. of Battery point, and the latter standing outside the entrance at 3¼ miles S. 33° E. (S. 17° E. mag.) of North point.

Landmarks.—Three white houses on the southern shore outside the entrance, one (the hospital) at a mile to the northward and the other two at ¼ and ½ mile, respectively, to the southward of Salt town, show conspicuously from seaward with the afternoon sun on them. Salt town can not be distinguished.

Northern breakers.—These dangers extend for 2½ miles from North point in a southwesterly direction; they break heavily at half ebb even in fine weather, and there are always heavy rollers upon them.

Southern spit.—The northern edge of this spit forms the prolongation to the southwestward of the shoals extending from the left bank of the river. The western extremity is S. 85° W. (N. 79° W. mag.) of Salt town, distant 3 miles, and S. 23° W. (S. 39° W. mag.) 3¼ miles from North point. From thence the southern edge trends ESE. for 4 miles, joining the shelf of sand and mud, ½ mile in breadth, which fronts the coast.

Shoals.—There are two shoals having a depth of 6 feet over them, ¼ and ⅓ mile, respectively, N. 72° W. (N. 56° W. mag.), and N. 16° W. (north mag.) of the western extremity of Southern spit.

Sunken wreck.—A wreck with one mast showing above water (in 1881) lies on Southern spit, ½ mile eastward of the western extremity; it is 3 1/10 miles S. 15° W. (S. 31° W. mag.) of North point, and 2 6/10 miles S. 85° W. (N. 79° W. mag.) of Salt town.

Bar.—Midway between Northern breakers and Southern spit there is a channel ½ mile in breadth and about 1¾ miles long, with a general depth of from 8 to 10 feet at low water.

In the rainy season this channel frequently breaks heavily right across, but in the dry season the bar is generally comparatively smooth, with not much sand. The bottom on the bar is of hard sand, changing to soft mud when off it; the swell is nearly end on with respect to a vessel crossing the bar. Vessels of 11 and 12 feet draft cross this bar, taking it at the last quarter of the flood at spring tides, having regard, of course, to the state of the sea, which should be well considered, as it sometimes unexpectedly breaks with overwhelming force.

Buoy.—A fairway buoy, black, conical, with staff and ball, has been placed in 4¾ fathoms, with North point bearing N. 37° E. (N. 53° E. mag.), distant 5¾ miles. This position of the buoy must not be depended on.

Directions.—The leading mark across the bar of Benin river is Harrison house (easily recognized as being a conspicuous white house on the western shore, the western and largest of four) just open southward of North point, bearing N. 40° E. (N. 56° E. mag.); this mark will lead over the bar in 8½ feet at low water springs. When about one mile from North point, gradually haul to the eastward, rounding it at the distance of about ½ mile, and when it bears N. 61° W. (N. 45° W. mag.), steer along the western shore in from 2½ to 5 fathoms, keeping from 600 to 1,000 yards from the bank.

Anchorage.—Off Harrison house there is good holding ground in 7 fathoms about 600 yards from the shore.

It is never advisable for strangers to spend a night within the bar, as the exhalations from the river are notoriously unhealthy, and the mosquitoes exceedingly troublesome; but should it be necessary to do so, a good berth is in 14 feet, mud, with the western part of North point bearing N. 39° W. (N. 23° W. mag.), distant 1,800 yards.

Benin road.—In this road, outside the river, much rolling and pitching must be expected, but it affords good holding ground, and is the only suitable anchorage for all trading vessels; the most convenient position for anchoring will be found in 4½ fathoms, black mud, with the SE. part of North point bearing N. 40° E. (N. 56° E. mag.), which is on the line of bearing for crossing over the deepest part of the bar.

This anchorage is 2 miles outside the bar, and 5½ miles from the river's mouth. The lower reach of the river will appear open, but from the roadstead the houses are not distinguishable from the deck.

Communication.—Steamers run from Bonny (the depot) weekly, calling at the intermediate rivers Brass, and Nun entrance of the Niger, on the way; they are due at Benin about a week after the arrival of the English mail steam packets at Bonny.

Sailing vessels are usually towed over the bar by these local steamers, the charge being about $200, the steamers supplying their own hawsers.

Pilots.—The best pilots are the masters and mates of these local steamers. No native pilots are to be obtained.

Tides.—It is high water, full and change, in the entrance of Benin river at 4h. 30m.; springs rise 7 feet, neaps 4½ feet.

The flood stream (December) runs only for 3 hours at the rate of 3 knots an hour at springs, and the ebb runs for as much as 9½ hours at a rate of as much as 5 knots an hour. The discolored water discharges itself over a range of 9 miles radius from the mouth of the river, and the 100-fathom line of soundings lies west, distant 28 miles from the shore; the depth increasing from 95 fathoms, black mud, to 119 fathoms.

On the bar, the ebb stream sets to the westward and the flood about ENE. In 1884, on several occasions when entering Benin river on the flood, was found setting towards the northern breakers.

Currents.—The general direction of the current off the Benin is to the southeastward, but after the harmattan has been blowing, it is often reversed, and runs sometimes with considerable strength.

Supplies.—A few supplies can be obtained in Benin river but with considerable difficulty.

Nanna creek.—At about 18 miles above Harrison house, in Benin river, is Nanna creek, which enters the Benin at Youngtown, situated on the eastern point of entrance. This creek with numerous windings and sharp turns, takes a general southerly direction with depths of from 3 to 7 fathoms, until it joins the Escravos river, near Mugine village. The creek is wide enough for vessels 200 feet long to navigate without running into the banks. The junctions between the creeks and river have shoals off the points. A pilot should be taken. Batari creek is reported to be deep but too narrow for anything but launches.

Coast.—From Salt town, on the southern entrance point of Benin river, the coast line trends about SE. for a distance of 10 miles; it is everywhere thickly wooded, but some remarkable clumps of fantastically shaped trees are conspicuous, some resembling the letter Y, while others have received the names of Ship tree, Giraffe tree, and Tower tree. On the narrow sandy beach the swell breaks but slightly, after rolling in across the 5-fathom flat, which extends 5 or 6 miles off shore.

Escravos river.—The funnel-shaped opening of the Escravos river which, unlike that of the Benin, has its southern entrance point the best defined, lies 13 miles south of Benin bar. Heavy breakers extend from this point for 3 miles to the NW., and at first sight appear to join those from the northern entrance point, but there is occasionally a space at one-fourth of the distance across the latter, where 8 feet water may be found; this channel is, however, too precarious and uncertain to be safely used.

Chanomi creek.—At about 4 miles eastward of Mugine village in the Escravos, is Chanomi creek, with depths of from 4 to 7 fathoms, leading to the Forcados river, which it enters at 10 miles above the mouth of that river.

These creeks are named after the chiefs of the district through which they pass.

Tides.—It is high water, full and change, in Escravos river at 4h. 27m.; springs rise 5 feet. The discolored water is seen when 6 miles seaward of the entrance.

Coast.—From the south entrance point of Escravos river the coast trends SE. for a distance of 11 miles to the entrance of Forcados river, being fronted by heavy breakers, which extend 2 miles from the shore for the northern 8 miles of that distance.

Forcados river.—This river is about 2½ miles wide, abreast the south point of entrance. Both banks are of moderate height, densely wooded, and bordered by a sandy beach. The entrance to the river is obstructed by a bar, but as the channel across carries 16 feet at low water and is of considerable width, Forcados river is one of the most accessible on this part of the coast, with smooth water and 5 fathoms water just within the bar. The distance from Forcados river to the Escravos by Chanomi creek, round by Goshawk point is estimated at 25 miles; and from the Escravos through Dali creek to the Benin river about 22 miles; while the distance by Ellagico river and Agaru creek, the route of large steamers, is about 55 miles. Steamers of 11 and 13 feet have passed through the short route.

Forcados is the main outlet of Wari, a trade center; hitherto the Benin River route has been used, the distance by this route being 150 miles, but a shorter track, by using Forcados river, has been explored, the channel being deep and direct. A steamer drawing 7 or 8 feet came by this short route in 5 hours, whereas the passage by the Benin usually takes 12 hours with the tide.

South point.—Beacon.—On South point is a black triangular beacon, 25 feet high, and about one mile S. 72° E. (S. 56° E. mag.) of the beacon is a conspicuous tree, abreast of Golon village. These, with Moore and Goshawk points, are useful marks for entering the river. (Beacon not seen in 1888.)

Moore and Goshawk points.—Moore point is a steep dark bluff, easily recognized, and on the north bank at about 4 miles within South point. Two miles eastward of Moor point, and about 13 miles from the bar, is Goshawk point, which slopes gradually to the river, and forms the western entrance point to Chanomi creek.

Anchorage.—Since 1884 ocean steamers have used the anchorage 6 miles from the mouth of the river for loading and unloading.

Bar.—The southern breakers extend about 4 miles WNW. ½ W. from South point, thence WSW. ½ W. for one mile. The northern breakers lie one mile northward of the southern breakers and from 2 to 3 miles off the northward bank of the river. There is said to be a channel between them and that bank, but the channel over the bar, which is 500 yards across between the breakers, is the most direct and the one used, and which has a known depth of 16 feet at low water.

Buoys.—Two conical buoys mark the bar and are on the alignment of Moore and Goshawk points.

Directions.—Great care must be exercised in using these directions.

Goshawk point, well open of Moore point, bearing S. 89° E. (S. 73° E. mag.), leads over the bar in 16 feet midway between the breakers, but Goshawk point being distant 13 miles from the bar may not be at first recognized. The bar should in that case be approached with the beacon on South point in line with the conspicuous tree abreast the village, bearing S. 69° E. (S. 53° E. mag.), which leads southwestward of the northern breakers, and when the leading mark comes on it should be steered for as directed. There is anchorage off Golon village abreast the conspicuous tree in from 4 to 5 fathoms.

On the bar the flood tide sets across it to the northward, the ebb in the contrary direction, which must be allowed for.

Wari.—The town of Wari is 3 miles up a narrow creek about 40 or 45 miles above the entrance to the Forcados. The river is about 400 feet wide off the creek, but there are 3 fathoms at low water close to both banks. If swinging to the ebb a hawser to a tree would slew a vessel for returning. A depth of 15 feet was the least water found by the *Dodo* in returning from Wari, but it is believed that a 4-fathom channel could be found from the sea to that place.

The *Dodo*, drawing 11 feet, grounded in the approach to Wari, as well as in the Nanna and Chanomi creeks.

Communication.—The West coast mail steamers call weekly and are met by the branch line steamers; cargo is transshipped one week for Lagos and the next for Benin, and is also sent up the Wari branch from here.

Tides.—It is high water, full and change, in the entrance of Forcados river at 4h. 22m.; springs rise 5 feet; the flood stream runs 3 hours at the rate of 2 knots an hour; the ebb 9 hours at 3 knots an hour, propelling the discolored water 13 miles seaward.

Soundings.—The bank of soundings to the 100-fathom line extends 30 miles westward from the mouth of Forcados river, deepening suddenly from 90 fathoms, black mud, to 180 fathoms, sand. The 5-fathom line, which lies 5 miles west of Forcados river, approaches the shore a little to the southward of it to within 3 miles.

Coast.—The coast southward of Forcados river has the same monotonous features as that to the northward; a dense forest and thick jungle rises from a narrow sandy beach, on which the surf but feebly breaks. In the whole space between Forcados and Dodo rivers there is no sign of habitation, and no apparent background until, on opening the Ramos river, the receding plain and its thick forests are preceptible. No columns of smoke are to be seen by day, nor fires by night, to give animation to its gloomy and forbidding aspect; an aspect, however, which is quite in keeping with the character of its treacherous inhabitants. From the south entrance point of Forcados river the coast trends S. by E. for a distance of 13 miles to the entrance of Ramos river.

Ramos river.—The outlet of this river is but $\frac{1}{2}$ mile wide between its entrance points, which are well defined; a dome-shaped tree appears in the background between them when bearing east (S. 74° E. mag.), which mark leads into the very limited channel over the bar. From the northern entrance point a sward and sandy spit, named Murder spit, extends a mile seaward, and a village stands near the high-water mark at $\frac{3}{4}$ mile within the south entrance point. Should it be necessary to visit this river the bar will be found most tranquil in the dry season.

Bar.—A belt of heavy breakers extends $2\frac{1}{2}$ miles from the shore in front of Ramos river, leaving occasionally in the middle a smooth space of $\frac{1}{3}$ mile in width. This part of the bar is a mile across, with 9 feet on it at low water, and therefore subject to a dangerous send of the swell. Inside the entrance points the estuary has straight sides which are steep-to for 2 miles, with 3, 5, and 7 fathoms smooth water. The bar may be crossed in the best water, and the first reach passed through by bringing the dome tree to appear in the center of the opening, and steering for it on the bearing of east (S. 74° E. mag.).

Tides.—It is high water, full and change, in Ramos river, at 4h. 20m.; springs rise 5 feet. The ebb runs 9 hours.

Anchorage.—The best anchorage outside the bar will be also found with the entrance bearing east (S. 74° E. mag.) in 5 fathoms, black mud, at 3 miles off the bar and 5 miles from the river's mouth.

Dodo river.—From Ramos river the coast maintains the same appearance, and the same general trend of S. by E. for a distance of 18 miles, where another river issues through an oblique opening with an island in its mouth. This river, known as the Dodo, is only ¾ mile wide in its lower reach, though the opening in the shore at its mouth appears to be nearly 3 miles broad.

Walker island occupies the southern portion of the opening, and is thickly wooded at its eastern angle. All access for vessels to Dodo river is apparently prevented by the shoals which extend 3 miles north and south of this island and 1½ miles to seaward.

Boat entrance.—Should any object lead to a boat expedition into this uninviting place, an opening in the breakers may be sought in the dry season close over on the northern side, where there is a channel ⅓ mile wide and 8 feet deep, found by bringing the lower reach of the river open to the northward of Walker island, on the bearing of S. 41° E. (S. 25° E. mag.); wait, however, for the last hour of the flood at spring tides, and look out also for the bar rollers, when approaching a low point which projects ½ mile in a westerly direction from the northern elbow of the entrance.

Caution.—Keep a good lookout for the troublesome and dangerous natives, who can, like those in Ramos river, launch out from the creeks in large numbers, armed with rifles, cane-knives, and hatchets; their pretense for coming being at first to offer dried fish for sale.

Tides.—It is high water, full and change, in Dodo river at 4h. 17m.; springs rise 5 feet.

Anchorage.—Anchorage may be obtained in 4 fathoms, black mud, with a distant arched tree in line with the northern extremity of the trees on Walker island, bearing S. 84° E. (S. 68° E. mag.).

The 5-fathom flat extends 2½ miles west of Walker island, and 1½ miles outside the bar breakers. The discolored waters of this river, like those of the Ramos, are seen when 7 miles in the offing.

Current.—The ebb stream sets north from the bar and the flood south; the outside current generally sets south at about a knot an hour.

Soundings.—The 100-fathom edge of the bank is 26 miles off shore in a westerly direction from the entrance to Ramos river.

Pennington river.—From Dodo river southward the coast is of the same featureless character, but bends nearly two points more to the eastward.

The depth of 5 fathoms is found at a distance 3¼ miles off shore, as far as a small opening, named Pennington river. This stream opens to view

on a S. 72° E. (S. 56° E. mag.) bearing, and is ⅓ mile wide, with 6 fathoms water when a mile within the entrance points, but has only 6 feet upon the bar, which extends over an area of 1½ miles. A narrow passage, between heavy and dangerous breakers, will be found by keeping the entrance upon the above bearing.

Middleton river.—From Pennington river the coast trends SE. by S. for a distance of 14 miles to the Middleton river, which from the offing has the appearance of a wide-mouthed estuary, with an island at its entrance (Miller island), leaving channels of equal breadth on either side. The southern opening is not a navigable channel, and is named False entrance.

The main entrance lies between George island and Miller island, a distance of nearly a mile, though the navigable part of the channel is narrowed by a spit extending ½ mile from the north extreme of Miller island.

From George island a narrow curved spit extends 2½ miles to the southward, between which and the bank extending from the south side of Miller island, there is a channel, about ⅓ mile wide, and in which the least depth is 2½ fathoms.

On the north side of the entrance, at about 1¼ miles east of George island, is an English factory.

Miller island is separated from the mainland by a narrow 3-fathom channel, which connects the main and false entrances to Middleton river; a shoal spit connects Miller island south extreme with the south entrance point of False entrance (South point).

Directions.—A vessel approaching from the westward should keep in not less than 5 fathoms water, until South point bears N. 74° E. (east mag.), when it may be steered for on that bearing; when the depth is reduced to 3 fathoms, alter course to N. 19° W. (N. 3° W. mag.) for 1½ miles, steering for North point. This will lead between the shoals, which extend south of George and Miller islands.

When Miller island south extreme bears east (S. 74° E. mag.), steer for the center of George island, until Lobia point (the next east of the factory), is in line with Factory point, which latter mark will lead to the anchorage.

The western edge of the bank, south of Miller island, does not always break. These directions should be used with care.

Tides.—It is high water, full and change, in Middleton river at 4h. 15m., springs rise 5 feet.

Soundings.—A flat, with muddy bottom, extends 3 miles off the mainland, and the depth of 5 fathoms is found at 1½ miles outside the bar; the 100-fathom edge of the bank of soundings is 30 miles off shore, and the discolored water from the river is met when about 4 miles to seaward.

Blind creek.—At 3 miles SE. of False entrance, there is another inaccessible opening, named Blind creek, ¼ mile in width, and from which breakers extend nearly a mile seaward.

Winstanley outfalls.—From Blind creek the coast line trends a little more easterly, with a mangrove covered shore, and similar quality of soundings, until, at 7 miles distance, two apparent river entrances, known as the Winstanley outfalls, appear. They are a mile apart, and both barred by heavy breakers, which are occasioned by the stream from the rivers meeting with the ocean swell; discolored water extends over a range of 4 miles seaward of the entrance to Winstanley outfalls.

Sengana branch.—A similar mangrove covered shore extends SE. by E. for a distance of 8 miles from Winstanley eastern outfall to the Sengana branch of the Niger. The Sengana is, however, so obstructed at its entrance by a sand bank in the center, and by the turbulent breakers which extend a mile seaward, that although presenting a rather inviting appearance at first sight, it is not accessible. By patiently watching for a favorable opportunity, landing may be effected on the outer beach, just to the northward of the northern entrance point, and by crossing the point, a view of a tranquil sheet of water within was obtained; but the apparent disposition of the natives would have rendered any further examination of the place, at the time of the survey, imprudent.

Soundings.—The depth of 5 fathoms is found at a distance of 4 miles seaward from the entrance to Sengana branch, the discolored water from which extends about that distance from the shore.

Niger river, which has its rise at mount Loma, flows in a northeasterly direction to Timbuktu and the borders of the Sahara, takes a sudden turn to the east and SE. when it changes its name to the Kwara, and is joined in its SE. course to the gulf of Guinea by its affluent the Binué, which rises in the mountains of Adamawa.

The Niger is an imposing river when first entered from the sea, but after passing the broad creeks which leave for Brass river the actual navigable passage narrows down into an insignificant channel for so vast a stream, and it is not until the numerous offshoots on both sides are passed that the main stream regains the breadth commensurate with its importance. In many portions below its bifurcation with the Wari the main Niger is very shallow, and it is here, in the dry season, some of the chief difficulties of its navigation are met with, rather than in its undivided flow between Abo and Lukoja.

The river commences to rise during the first week in August, and begins to fall about the middle of October, but the exact date or extent of its rise can not be predicted with certainity. The river is generally lowest in April, and the average range between the dry and wet season is about 24 feet, with occasionally an extreme range of 40 feet.

At the end of August, 1877, the river had risen nearly 30 feet, the banks in some places were 3 feet above water, in others nearly awash. Akedo, about 26 miles above cape Nun, is on the west bank of the river, which is here 200 yards wide; this is the first village of importance after leaving Darwall island. It is the market place for traders from Brass river.

Between Louis creek, situated 6½ miles north of the east entrance point, and Oguburi river (which joins the Niger on the western side at 42 miles above Trotter point), the channel, although narrow and in some places obstructed by islands, does not appear so liable to change nor so difficult to navigate as that part above Oguburi river.

Ndoni, on the western side of the river, 114 miles above Trotter point, is near the confluence of the delta. Abo, on the opposite side of the river and 2 miles lower down, is where the Royal Niger company have their hulk, near which their is anchorage in 5 fathoms water.

At Onitsha, lying on the eastern side of the river, 42 miles above Ndoni, a vessel should anchor nearly abreast the landing shed and westward of a line joining two cotton trees, situated NNW. and SSW. of the landing place. The stream runs at the rate of 5 knots an hour. It is not safe for vessels drawing 10 feet of water to remain at Onitsha after the end of November. The river steamers drawing 6 to 8 feet lay up about that time.

Asaba, nearly opposite to Onitsha, is the administration capital of the Royal Niger company. The hospital and botanical gardens are here.

At Ida, which is a large place, there is anchorage off the town in 8 fathoms water; the current runs about 3 knots an hour.

The river here is narrowed by the island in the center, being about 700 yards broad on the side of the town. The land rises again here, a cliff 96 feet high standing over the river, and on the slope of the cliff running down to the landing place is built the town, which extends to the edge of the cliff and runs back behind the brow of the hill. The natives are a fine-looking race, warlike and troublesome.

The first high land after entering the river is seen at Onitsha. It seems to be a quiet and flourishing place. The town is about 1½ miles inland and is hidden from the river by trees. There are four factories, a church, and nice houses with gardens. The country is more open.

At a distance of 105 miles above Onitsha the Niger is joined by the stream of Chadda, or Binué river, which enters it at Ghebe on the eastern side, opposite the town of Lukoja, which is a trading station and the chief missionary seat.

Between Onitsha and the Mohammedan town of Egga, a distance of 180 miles, the navigation is difficult, the channel being obstructed by rocks and the current running swiftly.

In the intermediate rocky region between Ida (about 220 miles above the bar, and Lukoja, 45 miles farther north) the existence of several dangers

has been reported, and it should be remembered that from the annual changes in the bed of the Niger the chart of one year is frequently useless for another.

At a distance of 52 miles above Egga the Niger is joined by Kudùna or Lafun river. The company's steam vessels navigate up to the rapids of Bussa, 100 miles above Rabba and 215 miles above Egga.

The breadth of the Niger in August, 1877, as far as Angiama (38 miles within the entrance) was about 150 or 200 yards; above this it increased in width, being fully a mile across in some places; at Onitsha the width was about 1,200 yards, with deep water on the eastern side of the channel.

On October 21, 1883, the Niger expedition proceeded from Baracoon point up the river for 220 miles to Ida, which took them four full days to accomplish, weighing anchor between 5h. 30m. and 5h. 45m. a. m., and anchoring between 6h. 30m. and 7h. p. m., proceeding at the rate of 55 miles a day, steaming at an average speed of 7 knots an hour, which makes the current run down at an average rate of 3 knots an hour. The shallowest water was in Louis creek, where in one place 12 feet was passed over. The maximum temperature on deck in the shade was 91°, which was at 4 p. m.; the average temperature in the day was 84° and in the night 79°.

Captain A. T. Brooke, in command of the Niger expedition, remarks: "Fever attacked nearly all who were engaged on that occasion," and attributes it to the fact that the river was at its highest while they were at Ida, but on returning it had fallen fully 3 feet, exposing a large extent of swamp and mangrove to the sun.

The tidal influence appeared to extend about 25 miles within the entrance. Off Taylor creek (60 miles up the river) the downward current, in August, 1877, was found running about 3 or 4 knots, and at Onitsha 3½ knots an hour.

Greatest draft.—To vessels of 6 to 7 feet draft the Niger is navigable with ease as far as Egga (340 miles within the entrance) during August, September, and October, and with but little risk as far as Onitsha, about 160 miles from the entrance, during July and November also. Vessels of 10 feet draft can proceed to Egga from the middle of August to the middle of October. Five feet has been carried 115 miles above Egga, or a total distance of 455 miles from the bar.

Trade.—The trade on the Niger river appears to be rapidly increasing; below Onitsha the chief export is palm oil, and above it ivory.

Nun entrance.—Nun entrance lies between cape Nun and Palm point, the former bearing from the latter N. 50° W. (N. 34° W. mag.), distant 1⅓ miles. The shores on both sides are thickly wooded, and are so nearly upon the level of the river as to form a vast pestilential swamp. This entrance somewhat resembles that of the Sengana branch, the latter being

not unfrequently mistaken for it. The point of difference between them is that when the rivers are seen from abeam the Sengana entrance points are both bluff, while in the Nun entrance, the eastern point is bluff and the western point a much more gradual slope. In clear weather the factory at Barracoon point would be seen, when the lower reach of the river fairly opens out. A small island, nearly ½ mile long, has formed off cape Nun; it is covered with grass and shows about 6 feet above high water springs.

Cape Nun.—The western entrance point, known as cape Nun, is also low and wooded, but the bush near the point is lower and slopes more gradually than that at Palm point.

Palm point.—The eastern entrance point, known as Palm point, is low and densely wooded. A village and mission house stand on the margin of the eastern shore, 1⅓ miles north of Palm point, and the chief's village, Akassa, is ½ mile inland of that village.

Trotter point.—This point, lying on the eastern side of the channel, north, distant 3 miles from Palm point, is low, with a remarkable clump of high trees close to its extremity.

Baracoon point, lying north, distant 2 miles from cape Nun, has on its southern side the Royal Niger company's establishment, which is now called Akassa. Several acres of ground are covered with dwelling houses, offices, factories, and storehouses. The company possess more than 20 steamers and steam launches for trade on the Niger and its branches. The transshipment between river and ocean steamers is transacted here.

Repairs.—There is a small engine factory, with a smithery, where any ordinary repairs to machinery can be made.

Coal.—A considerable quantity of coal, about 1,000 tons (mostly Welsh), is always in store. There are two wharves for coaling, or at which to load or unload. The upper wharf has 10 feet at low water alongside of it; the other wharf has 13 feet; this wharf is always used by the mail packets of the African and the British and African steam companies. It is necessary to have an anchor down both on the off-bow and quarter to hold the vessel against the tide, which, on the ebb runs very strong. It is also advisable to go alongside at slack water, and to secure with the vessel's head up stream. The wharves are none too strong, and a new one (October, 1884) is in course of construction to replace the upper one. Vessels can also coal alongside any vessel which might happen to be in port waiting to discharge.

Supplies.—Royal Niger company's officers are most obliging in providing live stock, fruit, and vegetables, and will also make arrangements for providing the same at their different factories up the river in case they should be required. They have, in addition, wooding stations at several points on the river.

Communication.—The English mail steamers nearly always call here on their way to or from Bonny river, but they are not to be depended upon, as some of the steamers can not cross the bar.

Channel.—At Baracoon point the channel is ¾ mile wide, and above that point it expands considerably in width for a distance of 3 miles when it again becomes contracted.

The only available channels for vessels proceeding above Baracoon point are through Alburka channel (which is entered immediately north of Baracoon point) and Louis creek, situated on the western side of the river 6½ miles north of Palm point.

Akassa creek, affording communication with Brass river, and available for vessels drawing 7 feet water, is entered on the eastern side of the channel 3 miles above Baracoon point.

Alburka channel carries deep water, but its numerous sharp turnings prevent its being used when descending the river. Ten and a half feet have been carried through Alburka channel. (1876.)

Louis creek.—In Louis creek the least water found in August, 1877, was 10 feet; it is recommended when proceeding down the river to pass through this narrow channel during the flood stream as the ebb runs strongly.

Alburka island.—A wreck marks the tail of the spit extending from Alburka island.

Western spit.—This spit extends from cape Nun in a southerly direction for 1½ miles, and almost always breaks heavily. The eastern edge is nearly straight and fairly steep-to, the 3-fathom line being about 300 yards from the line of breakers and running parallel to them.

Eastern spit.—The breakers in fine weather and at low water extend for over ½ mile to the southward of Palm point, but the shallow water passes ¾ mile farther to the southward, forming the Eastern spit, where there are always heavy rollers, within the influence of which it is dangerous for a vessel to get. The southwestern extremity of Eastern spit is 1¼ miles southward of Palm point, from thence it turns sharply to the eastward following the line of the coast. The western edge is fairly straight and deepens gradually into the bed of the river.

Bar.—In the rainy season this frequently breaks all over, but in the dry season when the bar is smooth it only breaks on the spits and shoaler part of the bar.

The bottom is of hard sand everywhere on the bar, and changes to mud immediately when off it.

Least depth.—A semicircular belt of sand and breakers, ½ mile in width, connects the eastern and western spits, having a general depth of from 7 to 9 feet on the western side and from 10 to 12 feet at low water on the eastern side, the outermost part of the bar being upwards of 3 miles south of Palm point.

In October, 1883, the least water found on the bar was 15 feet.

The steamer Sherbro, drawing over 17 feet water, crossed the bar both inward and outward in October, 1883, at high water springs.

When the leading marks are not visible, the lee breakers are a sufficient guide for crossing, unless the sea is very smooth, when boats should be moored to show the edges of the banks.

Outer anchorage.—A prudent distance to anchor off the Nun entrance is 3 miles from the bar, on the leading mark for the weather channel in 7 fathoms. This anchorage is very disagreeable owing to the heavy swell, to which vessels generally lie broadside-on in consequence of the easterly current.

Buoys.—A fairway buoy lies in 5 fathoms to mark the entrance to the lee channel, and is moored with Sengana point bearing N. 57° W (N. 41° W. mag.) and Palm point N. 34° W. (N. 18° W. mag.). To cross the bar, steer from the fairway buoy to the buoy off Palm point, about N. 61° W. (N. 45° W. mag.), passing outside the latter buoy. The shoalest water on the bar is crossed after the factories open off Palm point.

A black conical buoy is moored in 17 feet at low water springs, at ½ mile S. 52° W. (S. 68° W. mag.) of the elbow of the eastern spit; from it Palm point bears north (N. 16° E. mag.), distant $1\frac{6}{10}$ miles, and cape Nun N. 24° W. (N. 8° W. mag.), distant $2\frac{7}{10}$ miles. This buoy is liable to drift.

Pilots.—No native pilots are to be obtained. The masters of the trading vessels which may happen to be in the river occasionally act as such, but the most trustworthy pilots are the masters and mates of the branch steamers which run weekly from Bonny, and are due from four to five days after the arrival of the outward bound mail steam packet at that place.

Tides.—It is high water, full and change, in the Nun entrance at 4h. 15m; springs rise 5 feet; neaps rise 3½ feet.

The ebb stream runs (December) for 8 hours at the rate of 4 to 5 knots an hour at springs, and the flood for 4 hours at 3 to 4 knots an hour.

Directions.—Weather channel.—To enter by this channel, bring Trotter tree just inside of Palm point bearing north (N. 16° E. mag.) (the buoy being in line with Trotter point); this mark leads over the bar in 9 feet at low water springs. The channel is narrow, having depths of 7 feet at 160 yards on either side of the center, but it has the advantage of the sea being end-on to the vessel while crossing the bar, which is here ½ mile broad.

On deepening the water, borrow to the westward slightly, and steer up in mid-channel for the factories.

Lee channel.—This is the best and deepest channel into the Niger river. When approaching from the eastward, after passing Brass river, haul gradually into a depth of 4 fathoms at low water, keeping along the shore in that depth and steering about west (N. 74° W. mag.) until Sengana point,

which makes as a low bluff (the west point of Sengana river being shut in) is sighted on the starboard bow bearing N. 66° W. (N. 50° W. mag.).

To enter.—Bring Sengana point to bear N. 61° W. (N. 45° W. mag.), or open just northward of the buoy off the eastern spit, if in position. This bearing will lead over the bar, which is here ¾ mile wide.

The narrow and shoal part of the channel is passed when the factories open off Palm point.

Pass the buoy off eastern spit close-to on the outside, and steer up in mid-channel for the factories.

After passing Palm point a smooth reach of one mile wide, with depths of 5, 6, and 7 fathoms in it, extends for 3 miles to Trotter point, with 4 fathoms within 400 yards of its eastern shore.

The effect of the ebb tide will not be much felt until the river begins to open, when it immediately sets the vessel to the southward very strongly.

Caution.—In using both the Weather and Lee channels, the tides should be carefully studied, the best time for entering being during the last quarter of the flood. It should be borne in mind that in bad weather there is a heavy beam sea in the Lee channel, and even in the best and dryest season a heavy swell undulates, if not actually breaks, upon the bar.

Anchorage.—The berth is off Baracoon point in 8½ fathoms, mud, with the center of the factories bearing S. 74° W. (west mag.), distant ¼ mile. the river entrance being kept well open to get the sea breeze.

Soundings.—The discolored water from Niger river extends 4 miles outside the bar, and the 100-fathom line lies 33 miles off shore; a depth of 23 fathoms, fine dark sand, will be found when 16 miles southwestward of the bar.

CHAPTER X.

GENERAL REMARKS ON THE BIGHT OF BENIN.

Limits.—The bight of Benin is embraced between cape St. Paul and cape Formoso, which latter bears from the former S. 73° E. (S. 57° E. mag.), distant 325 miles. From that line, at two-thirds of the distance from cape St. Paul, the curve of the shore recedes 95 miles to the north-eastward, where, at the head of the bight, is situated the village of Odi.

The length of coast of the bight is about 450 miles, forming a long monotonous range of beach so uniformly low and flat that not a single inland eminence is visible from the offing; indeed the elevation of the ground above the sea in some places is scarcely 4 feet, and seldom exceeds 10, and even the most prominent clumps of trees do not rise to a height of more than 60 feet.

Character of coast.—The coast from cape St. Paul to cape Formoso is composed of sand and mud; sand of a bright yellow tint along the western two-thirds of the interval, and sand and mud along the eastern side of the bight, as well as on the margin of the estuaries of the numerous rivers. Whatever gentle undulations may be discerned on the shore, they will prove to be only sand hills thinly covered with a loamy crust, and densely clothed with weeds and brushwood; no part of them is more than 10 feet above low water or 5 feet above high water. Here and there single palms and cocoanut trees gracefully rise from the edge of the high-water mark, or a group of huts with their white conical roofs stands out in relief to the dense thicket or jungle background, while, on the receding plain, clusters of stately trees, when seen from the distance of 5 or 6 miles, present the appearance of green cliffs.

Near Kitta the trees are high and form large and distinct groups, gradually blending into a continuous line as far as Agweh, where the coast trees terminate, and the high beach is only occasionally dotted with them; between Great Popo and Whyda the beach is very bare, only occasionally rising into green hummocks.

Little Popo has extensive groups of palm trees at its *western* extremity and hardly any at the *eastern* part.

Great Popo has extensive groups at its *eastern* and very few at its *western* part.

Whyda has no conspicuous clumps of palm trees near the town.

From an offing of 12 miles, when seen from an elevation of 13 feet, the whole scene dips below the horizon; so that, in fact, throughout the bight of Benin, there is no object which, at that distance from the shore, would

enable a vessel to reach in to any particular station or identify any one position. At 8 miles from the shore the aspect is entirely different from that at 4 miles, so that until familiarized with the appearance of every place, one station can be recognized only by tracking it from another, assisted by the chart.

Windward or western arm.—Jungle, with groups of trees, covers the whole of the windward or westward arm of the bight, but it is interspersed with numerous villages and detached huts; throughout this long extent of coast there is but one permanent opening or outfall for the lagoon waters (Lagos river), but there are several partial breaks in the sand hills, through which the lagoons pour their swollen floods during the wet season; these breaks produce straight vistas, which appear like river openings, but across them the sand is heaped so compactly as to preclude any outfall during the rest of the year.

Leeward or southeastern arm.—The distinctive character of the leeward or southeastern arm of the bight is a continuous dense mass of trees, no longer fringed by a bright sandy beach, but growing on the muddy high-water margin of the sea; the many rivers and creeks which cross the Delta of the Niger river are also a peculiar feature of this arm. On this part of the coast there are very few groups of huts or remarkable objects by which a vessel may identify her position; but it contains thirteen of those river mouths, each possessing sufficient diversity of feature to be recognized. Much vegetable matter and silt is discharged from these at every ebb tide, which discolor the blue ocean water with a filthy scum of a brown color and sickening odor for the distance of several miles from the coast.

Soundings.—The soundings along the windward portion of the bight may be classed in the following zones: At one mile from the beach there is a depth of 8 fathoms, fine light-brown sand, extending as far eastward as Palma village; at a distance of 3 miles from the coast a depth of 10 fathoms is found with similar bottom; and at 6 miles from the beach, 12 fathoms over a similar discription of sand. At that latter distance from the shore the sandy bottom changes into olive-colored and black mud with broken shell, and the water rapidly deepens to 200 fathoms at the edge of the bank, which, though only 7 miles south of cape St. Paul, lies 18 miles from the shore on the meridian of Lagos.

The average width of the bank of soundings to the 100-fathom line is about 15 miles along the Windward arm.

The unceasing deposit from the scum poured out from the numerous rivers on the southeastern arm of the bight accounts for the much increased breadth of the bank of soundings, the 100-fathom line being found at an average distance of about 30 miles from the coast.

This broad bank of soundings affords a useful warning to the mariner when approaching the SE. part of the bight, which is skirted with muddy shallows to such a distance that the surf on the coast is not heard when in shoal water; along the western arm a vessel may stand-in to 6 fathoms, or ⅓ mile from the beach.

Caution.—Even in the western arm, however, the lead should always assist the lookout, or the navigator might unexpectedly find his vessel within the influence of the coast swell and rollers, the action of which is sometimes experienced when ¾ mile from the beach. The tendency of the swell to set a vessel to leeward should be allowed for at the rate of ½ knot an hour, when shaping courses at night or in hazy weather by day. Even steamers ought not to shoal the soundings below 8 fathoms when on the windward part of the bight, for unless their engines are occasionally stopped the roar of the surf will not be heard in time, though audible long before the foam can be seen in foggy weather. If there be no particular motive for hugging the shore at night along the windward coast, the best rule for preserving a 4 or 5 mile offing is to keep in 12 fathoms.

Anchorage.—Excellent holding ground is afforded throughout the whole of the bight of Benin, from close inshore out to a depth of 15 fathoms, which will be found at about 7 miles off the windward coast, and 12 miles from the leeward coast. The bottom is throughout of stiff black mud with broken shells covered by sand, and is well adapted for working the stream anchor with a bower cable, as the stream chain might not sustain the strain of the irregular swell, which occasionally assumes the form of rollers. Outside the depth of 15 and 20 fathoms, the bottom is composed of so soft a compound of olive-colored mud, broken shell, and decayed vegetable matter, as to require a bower anchor. Inshore, although the lead arming may indicate nothing but sand (which covers the bottom to the depth of a few inches), yet from cape St. Paul to Avons deep, the anchor will instantly bury itself up to the crown in mud.

Offshore anchorage.—Anchoring anywhere in the bight of Benin must be prompted by necessity and not from any hope of tranquility; for as the vessel lies more or less obliquely to the swell, according to the strength of the current, so unceasing heavy rolling is the sure result. If requisite, however, for the purposes of transporting stores between vessels, choose a 12-mile offing at least; and, if consistent with the purpose in view, select the windward arm of the bight, and as far westward toward cape St. Paul as possible, for the swell there is not so heavy, and the climate is less disagreeable than it is when farther eastward. In fact, several dry sunny days together, during the rainy season, may be enjoyed to the westward of Lagos, while it is incessantly raining to leeward.

Directions for anchoring.—Along the leeward arm of the bight a vessel should anchor at 9 miles off the coast in from 10 to 12 fathoms, not only

to avoid shoal water, but also on account of the heavy ground swell that is perpetually rolling in; if the land be not visible, and if with the vessel's head off shore the soundings are decreasing below 12 fathoms, it will be advisable to anchor, more especially if supposed to be opposite any of the river entrances, as the indraft of the flood tide extends 4 or 5 miles from the shore.

Winds.—The prevailing winds in the bight of Benin are from SW. and west, and the current along the western part of the bight sets to the eastward with a velocity varying from ½ knot to 2 knots an hour, so that both tend to sweep a vessel towards its southeastern shore. In June, 1878, an indraught of ¾ knot an hour was experienced.

Amid the anxieties of the commander of a vessel in such an unhealthy climate and on such an inhospitable coast, without a lighthouse or a single harbor of refuge, it will be no small relief to know that throughout the bight of Benin there does not exist an offlying shoal of any description, and that lasting gales of wind do not occur. A vessel has only to be kept clear of the actual beach on the windward side of the bight and off the river bars on the leeward side, which common vigilance can insure.

Tornadoes.—A vessel should be prepared for the tornadoes which periodically will assail her with more or less fury, and which otherwise may dismast or throw her on her beam ends. These squalls, however, give ample warning of approach; they are of brief duration, and generally blow off shore; they may take place at any period of the day or night from the beginning of March to the end of June; also during October and November.

They generally commence from the SE. and draw round through east to NE.; but this is by no means certain, as they have been experienced blowing right on shore. They have been known to begin at east and draw round to south, and they have also been experienced from the westward. When the sea breeze is strongest the tornadoes are found to be most violent. Hard squalls from the SE. are also occasionally encountered, which have not the characteristics of the tornado (the black arch and vivid lightning gathering to leeward), but are not the less dangerous. At Kitta the tornado often blows so as to make it a lee shore.

Barometer.—The barometer gives no indication of an approaching tornado, and maintains its uniform quiescent state, which in this region varies but a tenth above or below a height of 30 inches throughout the year, but the thermometer quickly falls 5° as the tornado approaches and continues to indicate its cooling effects for some hours after.

Indications of approach.—The tornado begins by agitating the surface of the sea at a distance, so as to be seen by day or heard by night; rain sometimes accompanies the first furious burst, and is driven with such force as to render it impossible to look to windward or discern anything beyond

a few yards distant, and its noise so overcomes the loudest voice that all orders necessary to meet the exigency must be conveyed by messengers.

Sanitary precautions.—It is important to health that all those who must keep on deck during a tornado should be in blanket dress; for, notwithstanding a high temperature, the rain numbs the limbs at the time and a chill follows. If stoves could be lighted below for a couple of hours after each tornado and on every day during the rainy season it would conduce much to general health.

Under sail.—In order to meet the first burst of a severe tornado, it is in general prudent to bear up from the indicated quarter—to furl all sails, including awnings, strike top-gallant masts, bar in ports and scuttles, and hoist the fore-staysail, for it is essential that the vessel should not receive the first burst on her broadside.

At anchor.—If at anchor (the best condition in which to receive a tornado), furl awnings until the wind has expended itself, and keep the fore-staysail ready, to cast the vessel in case of parting; then loose and slope awnings directly the wind ceases, in order to carry the succeeding deluge of rain to the waterways. During this lull, and while the wind is resuming its usual moderate force (a period sometimes of three hours), the perpendicular stream of rain is attended by rapid peals of crashing thunder, with scarcely an interval between them, and by vivid forked lightning which seems to proceed from all quarters at once.

Rainy season.—In April and May tornadoes may be expected at intervals of 48 hours, and sometimes twice on the same day. In June and July they occur almost daily or nightly, but are not accompanied by such violent wind; in August and September, the weather resolves itself into almost continuous rain, with strong sea breezes and heavy swell from the southwest. Occasionally, however, in the western arm of the bight during June, July, and August there is scarcely any rain, and but few squalls.

The coolest month of the year is June, when also strong breezes prevail from the SW., with the thermometer occasionally down to 77° F.

Dry season.—In October the weather gradually clears up, leaving November, December, January, and February the most settled and healthy months of the year. During these four months, the temperature in the shade scarcely varies by night or day, above or below the limits of 85° and 90° F.

Caution.—Exposure to the sun's rays between 10 a. m. and 3 p. m. should be studiously avoided, and sleeping exposed to the night dews is dangerous; therefore, whenever practicable, awning shelter should be provided for the crew throughout the 24 hours.

Working to windward.—In working to windward in the bight of Benin it is advisable to stand off on the starboard tack during the day, and

inshore on the port tack by night, tacking should the wind veer towards the west.

Smokes.—The land is frequently obscured by exhalations, locally termed smokes, which in the dry season, especially from November to May, prevail throughout the entire bight, but with less perplexing effects on the windward coast, where the bright sandy beach, with its fringe of surf, is easily seen through the haze, or the breakers are heard in time to warn the mariner of his proximity to the shore.

The smokes last usually for about three hours after sunrise, giving place at about 10 a. m. to the sea breeze.

Tides.—The beach indicates a vertical range of tide of about 4 or 5 feet, but the surf was so heavy and incessant on the shore, and the swell so constant in the offing, that it precluded actual measurement of the rise of the tides on the windward coast; along the leeward arm, where the water is smooth within the bars, the tidal establishment at each river mouth has been obtained. The navigator should therefore compute when to allow for the influence of either ebb or flood streams, which generally extends to a radius of 6 to 9 miles from the mouth of those rivers; more especially if intending to send a boat across any of the bars.

The velocity of the flood stream is much less than that of the ebb, as might naturally be expected from the vast outfalls of the freshets being added to the discharge of tidal water, the combined effects of which are expended over a considerable radius, with a velocity of 3 knots an hour at the mouth of a river, and one knot an hour in the offing; at half ebb a volume of turbid brownish water is discharged, upon which are floating uprooted trees, bushes, leaves, and jungle.

Current.—With the exception of the tidal influence off the opening of Lagos, there is only the current to affect a vessel when proceeding east or west along the western division of the bight, and the velocity of that varies from 12 to 48 miles per day. This current rounds cape St. Paul and sets to the NE. parallel to the coast line for about 25 miles; it then gradually assumes the easterly trend of the shore for the next 180 miles until abreast of the termination of sandy beach near Odi, and under ordinary circumstances, except during the harmattan season, without any inshore eddy. From March to June this easterly current brings loose patches of that remarkable and only seaweed seen in the bight, known as sargasso or gulf weed (*Fucus natans*), and which are seen at intervals of 8, 10, and 12 miles. Its delicate stalks, currant-sized leaves, and light-brown berries may be seen in parallel lines drifting from the SW., the patches averaging 1½ miles long by ¼ mile wide; they extend to within 25 miles of the shore, and are seen as far to leeward as Lagos.

Caution.—During the harmattan season (December to January), the current inshore occasionally sets to the westward with a velocity of

about one knot an hour; and even during the prevalence of westerly winds, when they have been blowing freshly up for three or four days, and thus pressed a superabundance of ocean water against the leeward arm of the bight, a reaction takes place, and a westerly current will be produced lasting for 12 and sometimes 24 hours. In such circumstances, if a cruiser be intent on keeping her position at night, it will be prudent to drop a boat in order to ascertain the direction of the surface current, and always to make a free use of the stream anchor.

Attention to these fluctuations in the set of the current is especially necessary along the leeward arm of the bight, when within the influence of the river tides, or when in less than 12 fathoms water.

Discolored water.—Frequently the discharge from the rivers on the leeward coast consists of a scum nearly 3 feet deep, resembling the lees of an oil cask, and from its deep brown color, so contrasts with the ocean blue as to present a remarkably defined and frothy margin, presenting all the appearance of a shoal. On approaching it a stranger would be much inclined to tack or anchor; but if the soundings be attended to, he will be saved much unnecessary trouble, and when crossing its edge he will find that, though its onward motion would sweep away a boat, it has no effect on a vessel of moderate draft.

Lagoon outfalls.—This discoloration of water, during the rainy season, extends sometimes as far westward as Jackin and Whyda, and to a distance of 10 miles from the shore; while inshore the outfall of the lagoons give the sea a light green tint. This lagoon water breaks out through openings in the beach during the rainy season, beginning with the month of April, and so continuing throughout the rainy season until October. These outfalls from Great Popo to the eastward are all, except the permanent opening of Lagos, barred by sand between October and April, leaving no other indication of their positions than the remarkable vistas through the wooded belt which lines the shore. In no case, however, do they afford accessible channels into the lagoons, for when most charged with water they only increase the usually dangerous surf; and when the freshets decrease the sea completely replaces the sandy beach.

Temperature of sea.—The temperature of the sea is generally within a degree, more or less, of that of the air for the first 10 or 15 fathoms of depth, but at 20 fathoms below the surface it is cooled 2°, at 30 fathoms 10°, at 40 fathoms 17°, at 50 fathoms 20°, and at 100 fathoms it is 25° less than that of the surface.

Lagoons.—On the windward arm of the bight narrow lagoons extend parallel with the shore throughout nearly the whole extent from cape St. Paul to Lagos river. The average distance of these lagoons from the coast is about a mile, and on their northern sides are built several trading ports with landing places on the seacoast.

These inland waters afford ready communication between the extensive and comparatively little known lakes or lagoons named Avon waters, Denham waters, Porto Novo lagoon, Lagos lagoon, and Kradu water. The shores of these lakes are thickly inhabited and produce abundantly palm oil, indigo, etc.

Lagos lagoon extends about 10 miles in a northerly direction from Lagos island, where it terminates in a bay (Ikoradu bay) which receives the waters of the Ogun river.

Kradu water.—At the distance of 9 miles NE. of Lagos island, a narrow channel, obstructed by Palaver islands, connects Lagos lagoon with Kradu water, which is a long narrow lagoon extending 27 miles eastward from Palaver islands to the native town of Epeh situated on its northern shore.

In February, 1864, a vessel drawing 5 feet water proceeded from Lagos to Epeh, finding a depth of only 5 feet in the narrow channel off Palaver slands.

Kradu water receives the waters of two extensive rivers, the western, known as Abeokuta river, affording communication with an extensive native town of the same name; the eastern is named Oshun river. At the junction of Oshun river with the lagoon there is a branch said to communicate with Benin river.

Abeokuta river has been examined for a distance of 32 miles in a direct line from its junction with Kradu water to the town of Aro. The breadth of the river varies from 30 to 100 yards, and the banks are generally low.

At Aro, in November, the depth in the channel was 2 feet, and at 8 miles above that town the river even in the wet season becomes impassable.

A rapid downward current was experienced in the river, which is only navigable by boats.

The town of Abeokuta is situated about 4 miles north of Aro.

Victoria lagoon.—The Victoria lagoon, for a distance of 9 miles west from its junction with Lagos river, has a general depth of from 12 to 18 feet; westward of this the channel is narrow and intricate for a distance of 7 miles, but after passing these narrows the bottom is clean in the center, with a uniform depth of 10 to 30 feet up to the town of Porto Novo. West of the narrows the water is perfectly fresh, but not wholesome. Fish abound, mullet frequently weighing 3 or 4 pounds; oysters and other shell fish are excellent and plentiful.

A vessel drawing 9 feet may generally reach Badagri from Lagos through the lagoon, which is ¼ mile wide at Badagri and 16 feet deep; the intervening ridge of sand between it and the beach is about a mile across.

Westward of Badagri the lagoon on its northern side receives the waters of Addo, or Yewa, and Ajarra rivers. These rivers are free and open to the inhabitants of the English and French protectorates.

Off Badagri in the wet season the current occasionally attains a velocity of 2½ knots an hour, being influenced in direction by the wind.

Porto Novo lagoon.—Westward of the entrance to Gidy river the lagoon expands in width to about 1¼ miles, and is known as Porto Novo lagoon, from the extensive native town, containing a population of about 10,000, situated on its northern side.

The shores of this lagoon are low and uniform in appearance, being composed of bog and floating grass closely matted together. The trees in the vicinity of the shores are generally small.

Toche channel.—At about 2½ miles SW. of Porto Novo is the entrance to Okpara or Wemeh river, immediately south of which the lagoon contracts in width and forms Toche channel, a narrow strait communicating with Denham waters.

In December, 1876, there was a depth of only 3 feet in Toche channel, and a tidal rise of 6 inches was observed; during December the water in the lagoons is generally lower than at any other season.

Denham waters.—Westward of Toche channel the lagoon expands considerably in breadth and increases in depth. This part of these inland waters is known as Denham waters.

Numerous towns, built on piles, are situated on this lagoon, which in September, 1876, had a general depth in it of from 8 to 10 feet. In the dry season there are several shoals with less than 3 feet water on them.

The Zuno, or Eso, river enters the lagoon at its northern extremity; this river, which joins the Okpara at 12 miles from its mouth, is only navigable by canoes.

At the southwestern part of Denham waters is situated a shoal creek, leading to the native town of Kotonu, where there are some French factories.

There is a telegraph station at Kotonu close to the west of the factories.

Time ball.—A time ball is hoisted on the flagstaff of the telegraph office; the time is given from Loanda. Small steamers run between Kotonu and Porto Novo.

Wemeh, or Okpara, river.—This stream, which affords water communication between Lagos and the landing place for Abomey, the capital of Dahomey, was found to have a depth of from 5 to 12 feet in it (in December, 1876) between Porto Novo lagoon and the town of Kesamu situated 18 miles north of it; at Kesamu the river was about 125 yards wide and no current was perceptible.

In September, 1876, the Colonial steamer *Eko*, drawing 4½ feet, ascended Okpara river as far as Dugba, a distance of 55 miles from Porto Novo lagoon and 23 miles SE. of Abomey. The downward current at this season was found to be very strong.

It is estimated that the difference of level of Okpara river between wet and dry seasons is from 6 to 8 feet.

Avon waters is the name of an extensive lagoon lying north of Porto Seguro; it is also locally known as Hako lagoon, and is said to form a junction with Volta river at a considerable distance inland.

Between Porto Seguro and Jackin a narrow lagoon extends for about 50 miles, being separated from the coast by a narrow sandy ridge; several streams flow into this lagoon on the northern side, and it has a permanent outlet lying eastward of Grand Popo.

The depth in this lagoon during the dry season is only about 2 feet, but in the rainy season it increases to several fathoms.

Landing.—It should be borne in mind that however practicable the surf may occasionally appear nothing ought to induce an attempt to land anywhere between cape St. Paul and the termination of sandy beach at Odi in other than local canoes, and even they require much skill in handling and the assistance of extra hands to receive and haul them up as well as to launch them. The signal gun, with ensign at the fore, will be at once understood by the natives as a signal for a canoe, though perhaps tardily obeyed. The factories will supply surf boats.

Canoes.—The part of these canoes reserved for passengers is at their bow, where 3 or 4 feet of housing is formed to keep out the sea when thrusting through the surf in the operation of launching, and it affords the only chance of keeping anything dry. More than two persons can not well occupy this limited space, and other passengers must sit on the thwarts between the double-banked paddlers, who themselves sit obliquely on the gunwale with their faces toward the bow. The padroon or coxswain steers with a paddle. In disembarking the passenger may sit or stand in the fore part of the canoe, in order to be ready to jump on shore quickly, lest he be swept out by the succeeding surge.

Embarking.—The canoe is made ready with her prow outward and hauled up her length on the beach, while the crew are ranged on either side, reaching down to the thwarts so as to lift her out of the sand dock, as well as to launch her, which they begin to do with the assistance of the beach men as soon as the second of three heavy waves has broken. The steerman now watches with experienced eye for the following swell when, with energetic exclamations and gestures, the canoe is floated off on the expended wave; each man jumping into his place with his paddle, and so simultaneously and expertly as not to overbalance her. The head is then dexterously kept to the sea, but the canoe is not propelled forward till the steerman again gives the word; and sometimes a long interval is occupied in watching the swell and in moving a little backward, forward, or perhaps sideways, which is cleverly done by a sculling motion of the paddles without altering the direction of the head, which must be kept toward the

surf. Many anxious minutes are passed in this way till the state of the outer swell seems all at once to justify a dash, and then, with great urging at one mement and expertly checking at another, the buoyant little boat is passed from ridge to ridge.

It is always prudent to have the ship's boat waiting at the back of the surf, and it is advisable to head up in a small cask such things as it may be desirable to pass dry through the surf.

Casualties.—Very few accidents occur to these canoes when freighted with passengers only, but with cargo they often capsize, especially when loaded with such top-weight as casks of palm oil and oxen, or when landing crates and dry goods in cases.

Trading posts.—The principal trading posts in the bight are Dano, Afloa, Bay Beach, Porto Seguro, Little Popo, Agweh, Whyda, and Badagri. On the leeward coast are the Benin and Forcados rivers and the Nun entrance of the Niger.

Watering.—It is not advisable for cruisers to obtain wood and water anywhere in the bight; nor can there under ordinary circumstances be any occasion to do so, as Fernando Po and Princes islands are within 3 days' sail to the southward. In cases of necessity, however, the natives will bring off water, and merchant vessels generally so provide themselves. With attention, an ample quantity of rain water may be saved during two-thirds of the year for cooking and washing purposes.

Currency.—The cowrie shell formerly was the usual currency, and is decidedly advantageous to the voyager in point of exchange; though heavy and bulky it is still universally employed inland, but the coast natives are now accustomed to the European money. At Agweh the cowrie is still the currency.

Ornaments.—Cowries are employed by the natives for other purposes than money. They perforate the apex of the shell and string them like beads for bracelets, armlets, and necklaces, which are adopted by both sexes, and are connected with their mystic rites of *fetish*.

Supplies.—Abundance of stock and a moderate supply of vegetables can be obtained at several stations on the windward coast, viz, Weh, Jella Koffi, Kitta, Elmina Chica, Little Popo, Agweh, Whyda, and Badagri. The four first-named places are the most convenient, as the anchorage off them is generally smoother, owing to the vicinity of cape St. Paul, and the natives are generally more anxious to get rid of their stock than at the populus stations to the eastward; at Badagri abundant supplies can be procured when the surf admits of their being brought off to the vessel.

Excellent yams are to be obtained at Fernando Po, and, if whitewashed and stowed in a dry tank, will keep for a couple of months. Yams should be unsparingly allowed as a substitute for buiscuit, which is speedily injured in this climate.

Fish.—The climate in the bight of Benin causes meat as well as fish to rapidly decompose, requiring them to be cooked or salted within three hours of being killed, and even salting is often unsuccessful; for this reason fish is not easily procured from the shore, though the lagoons produce carp and large prawns. The only fish that will take the hook, and that in uncertain and small quantities, is the sucking fish (*Remora*), which is about the size of a dogfish; numbers of these may be seen early in the morning, when at anchor, about 4 feet below the surface.

The bight of Benin is visited in January by great numbers of sea blubber or medusæ; in May by the flying fish; in June by porpoises, bonettas, and dolphins; in July and August by the black whale, generally in pairs; in August by young sharks, and sucking fish then appear in greater abundance than during the other months. The full grown voracious shark abounds at all seasons, and the other fishes above mentioned do not actually restrict their visits to those specific periods, but they are then considerably more numerous than during other months of the year.

The animalcules which occasion the luminous appearance of the sea are equally prevalent throughout the year, but they are most remarkable during the dolphin season, darting in myraids obliquely from the sides of a vessel and across her bows and wake; the trains of phosphoric light, which they produce a few feet below the surface, appear then to be more than ordinarily brilliant.

Birds.—The sea birds that frequent the bight of Benin are few in variety, and not more remarkable in one season than another. The common sea gull is found in the openings of the rivers as well as in the offing; flocks of sea plover and stray boobies are occasionally seen, and a few sea swallows, or petrels, are ever skimming in the wake of a vessel. In June, a multitude of white-breasted birds of the crane species congregate on the flat muddy shore, which terminates the sandy coast near Odi, and are so numerous as to give it the appearance of being a white stony beach, until closely approached, when they simultaneously rise like a cloud, and discover to the startled spectator a black muddy strand.

Insects.—When lying within three miles of the windward shore of the bight, at night especially, the land breeze often brings off a few stray butterflies; mosquitoes, which are numerous on shore, do not invest vessels in the offing; cockroaches, ants, weevils, and occasionally centipedes, are generally numerous on board vessels employed in the bight.

Salt.—While running along the coast, at a distance of a mile or two, the natives may be seen carrying calabashes of sea water from the beach to mounds raised above the ground, in which the water by exposure to the sun is evaporated, and salt obtained for curing the lagoon fish.

CHAPTER XI.

CAPE FORMOSO TO KAMERUN RIVER.—BIGHT OF BIAFRA.

Bight of Biafra.—This extensive indentation on the western side of Equatorial Africa lies between cape Formoso to the north and cape Lopez to the south, the distance between these points being no less than 333 miles NNW., and SSE.; this line of direction almost touches the NE. point of Princes island, which is situated nearly midway between the above capes.

Within the limits of the bight—whose shores extend about 600 miles, between latitude 4° 30′ N., and 0° 45′ S.—numerous rivers, including some of the mouths of the Kwara, or Niger, Old Kalaba (Calabar), Kamerun, Gaboon, and other streams of less importance, flow into the sea. In the extreme NE. angle of the bight, the waters of the Kamerun river, with those of numerous affluents, join the ocean, whilst on its northern shore closely bordering on the sea, rises the Kamerun mountains. The volcanic origin of the whole district is strongly marked by scoriæ, and numerous streams of lava which have reached the sea; though from the present condition of its surface, it must have been for ages in a state of repose.

Caution.—In sailing along this coast, a vessel should not shoal the water to less than 10 fathoms, nor approach the land nearer than 3 miles, for the coast can only be considered to have been partially examined. Too much dependence should not be placed in the plans of Corisco bay, the Gaboon river, or Cape Lopez bay, for it is probable that the sand banks shift from time to time, acted upon by the strong ebb from the rivers and the great ocean currents outside.

Surf.—Along the whole extent of coast between Suellaba point and cape Lopez, the surf is not always continuous. To the northward of Corisco bay, during fine weather, there is often not a ripple on the beach; and though the surf is heavier on the open beaches south of Corisco bay, landing is some times comparatively easy. The swell, however, will rise, and the surf break, irrespective of weather, when influenced by the age of the moon, and mostly so for a day or two after the full and change.

Winds and seasons.—Along the entire coast of the bight of Biafra, principally from June until October, the prevailing winds are from SW. to SSE., varying during the 24 hours, according to the law of land and sea breezes; that is, from SW. from 10 a. m. to an advanced hour in the night, and then backing round toward morning; so that in order to take advantage of these periodical variations, vessels going to the southward should

so arrange their boards as to be near the land about midnight and profit by the land breeze from SSE., and in the offing about noon to utilize the sea breeze in running toward land. This system of navigation will be found to be specially advantageous between the San Bento river and cape Lopez; for though the breeze during the early morning is from the southward, it generally draws round to SW. toward noon in the offing. At this hour it would be better to tack in shore, and if the wind does not change it would be advisable to close the coast and anchor, especially during the months of March and April, the seasons of calms and tornadoes, in order to prevent being set to the northward by the current.

On the south side of the bight the winds are off the coast, and nearly always moderate. As a rule they blow from SSW., but from June to October, inclusive, they vary from SSE. to SSW., and at this time the anchorage within cape Lopez is smooth. Tornadoes blow from the eastward, and in the season are frequent, though not so much so as at the Gaboon. At the end of November storms are of frequent occurrence, and abundant rain falls sometimes for several days in succession. During December, January, and February, the fine weather season, the harmattan prevails, and, though not continuous throughout this period, occasionally blows for several days without intermission.

Generally it may be said that the seasons as far south as the Gaboon river are similar to those of the bight of Benin; but to the southward of the Gaboon the rule for the seasons begins to change, and they partake of the characteristics of the weather south of the equator, which is not so rainy as that of the coast to the northward and westward as far as cape Verde.

Currents.—The cold waters of the South Atlantic, and the polar currents, which connect in approaching the cape of Good Hope, would appear to be joined by that portion of the Agulhas current which rounds the cape, and thence as a united stream set to the northward and westward along the western shore of South Africa, following in part the trend of the coast. The united stream has a tendency to set a vessel towards the coast, during and after strong on shore winds, especially in the neighborhood of Dassen island. Abreast of the Kongo, the stream from that river mingles with the current, which continues on to cape Lopez, where the main body takes a westerly trend and is absorbed in the Equatorial current; whilst the remaining portion, after passing cape Lopez, appears to set toward cape St. John, and thence following the sinuosities of the coast continues as far as the Kamerun river, and is then lost in the tail of the Guinea current.

Between the Gaboon river and cape Lopez it is difficult to assign a definite limit to the velocity of the current, as it is so largely influenced by the direction, strength, and duration of winds. Sometimes, though very rarely, no current is experienced along this coast for several days in succession.

At 2 miles off cape Lopez a SW. current of 2 miles an hour has been experienced, **and at from** 10 to 20 miles off the cape a SW. current of nearly ¾ mile.

Soundings.—The bank of soundings **extending** off the coast between Suellaba point and cape Lopez varies in **breadth from** 14 to upward of 25 miles. It is narrowest between capes Two Points and **St. John,** and becomes much more extensive to the southward of cape Esterias. **From Gombe** point the coast is moderately steep-to as far as the Paps, with depths **varying** from 5 to 10 fathoms, from 2 miles and upward off shore, whence the depths increase regularly to the edge of the plateau, the general nature of the bottom being sand and mud, occasionally intermixed with gravel and shells.

Abreast of the Paps, the approaches to the coast become shallower, and gradually extend in advancing to the southward, until abreast of Fanaes islet; the same depths are found at a distance of 6½ miles off shore. If the French bank exists, it lies about 16 miles to the westward of Fanaes islet, and soundings prove that there is a channel between it and the banks along the coast. Off cape Lopez, the limit of the bank of soundings seems to be about 15 miles to the westward, and at this distance will be found a depth of 88 fathoms.

Cape Formoso.—The eastern limit of the bight of Benin, is also the western boundary of the bight of Biafra. The line of coast from it to Kamerun river, where the shore turns abruptly to the southward, is almost flat, appearing of a dark color. It is intersected by several rivers, of which the more important are the Bonny, the New and Old Kalaba (Calabar), and the Rio del Rey. These are, however, generally difficult of access, each being obstructed by a bar at its outlet.

Cape Formoso, which is low and wooded, forms the extreme southern extension of the Delta of the Kworra, Kwara, or Niger river.

Tides.—It is high water, full and change, at cape Formoso at 4h. 8m.; springs rise about 6 feet.

Brass river.—At 9 miles east of Palm point, and 4 miles east of cape Formoso, is the entrance to Rio Bento, or St. John, more commonly known as the Brass river.

Entrance.—The entrance is ¾ mile wide, and lies between two points, which, when the entrance bears N. 7° E. (N. 23° E. mag.), appear well defined, the trees on the western point being more rugged and lower than those on the eastern point.

Within the entrance points, the river expands to 2 miles in width abreast the factories, which breadth it maintains as far as Opulobo or Big island, lying nearly in the middle of the river, 4 miles from the entrance.

East point.—The eastern entrance point is densely wooded, the trees extending close down to the water's edge, the sand being gradually washed

away by the current, which sweeps round the point with great velocity. The edge of the bush shows as a distinct bluff (slightly cut away near the bottom) from nearly all directions, owing to the sharp elbow formed by the junction of the eastern river bank extending to the southwestward in nearly a straight line, and the line of that coast trending in an ESE. direction for 2½ miles.

West point.—The western entrance point, 1⅓ miles SSW. of East point, is low and sandy, the edge of the bush being 300 yards from high-water mark; it appears to be extending to the southeastward. Though this point is a well defined elbow, yet, from its situation with reference to the entrance, it is not so clearly distinguishable from a distance as East point.

Coast.—From West point the coast extends in a westerly direction for 2½ miles, forming a slight bay before reaching cape Formoso, 3½ miles distant; the line of coast to the northward runs north for one mile, and forms the right bank of the river, it then turns to the westward (forming a bay 1¼ miles long and ⅓ mile deep) to Akassa creek, 2½ miles within the entrance. From the point at the mouth of Akassa creek, the right bank of the Brass extends northeastward to above Opulobo island.

Landmarks.—The trees on West point have a very ragged appearance (which assists to identify the river) in contrast to those on the east side, where the tree tops are almost of a uniform height, with no noticeable clumps, except one known as the Haycock (which it somewhat resembles), 4 miles eastward of East point, and another very remarkable tree with spreading branches, ⅔ mile further to the eastward. On the west side, Join tree on cape Formoso is remarkable, and also a clump 2½ miles westward of West point.

Western spit.—The sand spit extends in a southerly direction from West point for 1¾ miles, with only a depth of one or two feet at low-water springs, and always breaks very heavily. The eastern edge is nearly straight and steep-to.

Western breakers.—These breakers are the continuation of Western spit, curving round to the eastward for 2½ miles further, and forming the bar. The shoalest spot is on a large patch 800 yards long by 300 yards broad, having only 4 feet at low water on its eastern edge, and is 3½ miles S. 13° E. (S. 3° W. mag.) of East point and 2¾ miles S. 33° E. (S. 17° E. mag.) of West point.

There are two smaller heads of 5 and 6 feet, situated 600 yards and 1,600 yards, respectively, WNW. and W. by N. of the large patch.

The general depths to the westward of these shoal heads are from 7 to 9 feet and to the eastward from 8 to 12 feet; generally the further east the deeper the water found.

The patches above mentioned break occasionally at high water even in the finest weather, and the whole bank breaks heavily at half ebb.

The outer edge of the western breakers is steep, falling suddenly from depths of 6 and 8 feet to depths of 16 feet or more. The bottom is always of sand on the breakers and of mud immediately outside them.

Hartley bank.—This small detached sand bank, having 11 feet at low water and forming the NE. extreme of the western breakers, is 3½ miles S. 33° E. (S. 17° E. mag.) of East point and 3 miles S. 55° E. (S. 39° E. mag.) of West point. In the rainy season there is always a very heavy break on this bank.

Shore spit.—From East point, off which shoal water extends 275 yards, the line of shallow water (which breaks or not, according to the state of the weather and tide) runs in a SE. direction for one mile and then turns ESE. ½ E. for 2 miles further, maintaining a distance of about 1,200 yards from the coast. From this point it projects to the southwestward toward the line of Western breakers under the name of the Shore spit, the southwestern extremity being 3 miles S. 50° E. (S. 34° E. mag.) of East point and one mile N. 21° E. (N. 37° E. mag.) of Hartley bank.

The Shore spit breaks in fine weather at half ebb, and there are always heavy rollers upon and to the southward of it, within the influence of which it is dangerous for a vessel, particularly a sailing ship, to get, as both ebb and flood streams set towards the spit.

Bar.—Between these rollers off Shore spit and the Western breakers, a distance of nearly one mile, there is a channel with from 13 to 14 feet at low-water springs. The bottom is of hard sand on the bar, changing to soft mud on either side.

Occasionally in the wet season the bar breaks all over, but generally in the dry season the channel is comparatively free from actual breakers during the last half of the flood, though there is usually a long swell. Ordinary boats can not cross the bar of the river except in fine weather.

Buoy.—A conical buoy, painted black and red in vertical stripes, is moored in 5 fathoms 1½ miles outside the bar on the line of the leading mark for entering and 5¾ miles S. 36° E. (S. 20° E. mag.) of East point. This buoy is liable to break adrift during the rainy season.

Outer anchorage.—Vessels arriving off the Brass river should anchor in 6 fathoms about 3 miles westward of the buoy.

Pilots.—From the anchorage neither houses nor shipping can be seen, and, as the report of a gun is not readily heard at that distance from the shore, a vessel requiring a pilot must generally send a boat for one. Should the signal be recognized, a pilot will come off as soon as the bar is practicable; but the best pilots are the masters and officers of the local steamers.

To enter.—The best time to cross the bar is during the last quarter of the flood; vessels of over 16 feet draft should not attempt it.

A range of hills on the west side of Brass river, a short distance inland, terminates in a well-defined shoulder which, kept just open of East point,

bearing N. 36° W. (N. 20° W. mag.), leads over the bar (which is here 1,200 yards in width) in 13 feet at low water, passing 200 yards eastward of the Western breakers and of Hartley bank.

On this bearing, a peculiar hole in the bushes, just inside East point, is noticeable, and is of itself a good guide, should the shoulder of the hills be obscured. On making sure that the Hartley bank is passed (the water deepening to 16 feet at low water, and the bottom changing from hard sand to soft mud) haul up N. 55° W. (N. 39° W. mag.), northward of West point, for 2⅓ miles, when the channel will be fairly open, and course may be altered to N. 13° W. (N. 3° E. mag.) in mid-channel, giving East point a berth of ⅓ mile.

The shore is steep-to northward of West point, and so also is the eastern side of Western spit, which may be approached with safety. Both flood and ebb streams set strongly toward the eastern shoals; a vessel should therefore keep nearer the west side on entering, which also brings the sea more end-on. In the rainy season the river entrance is often obscured by thick weather even when in 5 fathoms water.

Akassa creek.—The eastern entrance to this creek is 1½ miles northwestward of East point, on the western bank of Brass river; it affords communication between the river and the Nun entrance of the Niger, available for vessels of 7 feet draft, and is much used by merchant steamers trading on the Niger, as the bar of the Brass river is easier to cross than that of the Nun entrance. The chief difficulty in navigating Akassa creek arises from its being so narrow (especially about midway between the rivers) and from the three sharp bends in it.

Boats can cross the flats in Akassa creek not later than three-quarters tide. A favorable tide will be carried through all the way by taking care to arrive on these flats at about high water, the ebb tide running out through both eastern and western arms of the creek.

Tua creek.—This small creek on the eastern bank, one mile above East point, leads to Tua town, a large native village one mile inland.

Factories.—Numerous factories, extending about one mile, are built on the eastern shore of the Brass, there being a considerable trade in palm oil and ivory. The upper one (Harrison house) is 1¾ miles above East point. The Mission house is the most southern building, situated 200 yards from the beach, at ¼ mile from East point.

Anchorage.—Vessels anchor in 4 fathoms, mud, off the factories near Tua creek, about 1¼ miles above East point, and ⅓ mile from the shore, looking out to have West point open so as to get as much of the sea breeze as possible.

Tides.—It is high water, full and change, in the entrance to Brass river at 4h. 30m.; springs rise 6 feet, neaps 4 feet. The ebb stream sometimes runs as much as 5½ knots an hour at springs during the rainy season. It

generally runs about 4 knots an hour at springs, and the flood tides 3 knots an hour. Both ebb and flood streams set toward Shore spit.

Communication.—Local steamers run from Bonny with the mails weekly, being due two or three days after the outward bound mail steam packet arrives at Bonny. There is communication with Liverpool on alternate Saturdays.

Supplies.—A few fowls and eggs can be procured at Tua town. Fresh water can only be obtained in limited quantities, and depends on the supply the resident traders have for themselves. Rain water is used for drinking, the well water not being recommended. A doctor generally resides at the factories.

Telegraph.—Harrison is in telegraphic communication with Accra and Bonny town.

St. Nicholas river is little known and seldom visited; it is 9 miles east of Brass river, and separated from it by slightly elevated wooded land, the coast line of which curves boldly seaward. The eastern bank of St. Nicholas river is terminated by a large rounded point; the western bank is higher and slopes toward the sea. The two entrance points are very distinct, with the mouth of the river open and bearing N. 39° W. (N. 23° W. mag.), but the entrance appears when seen from the offing as if closed by distant wooded land. On the bar there are from 3 to 6 feet at low-water springs, and at 6 miles above the bar St. Nicholas river joins the Brass river. The entrance of the river may be known by a high conspicuous clump, about ¾ mile east of the East entrance point.

Santa Barbara river.—The coast eastward of St. Nicholas river is low, with mangroves, and fringed by a sandy beach. The entrance of Santa Barbara river lies 10 miles eastward of St. Nicholas river; it opens out when bearing about N. 7° E. (N. 23° E. mag.). Its banks are thickly wooded. The western entrance point is perpendicular, and the eastern point forms a slight slope, having a small part broken into steps.

San Bartholomeo bank.—As far as Santa Barbara river a vessel approaching from the westward may run without fear, at a distance of 3 miles from the coast, in a depth of 4 and 5 fathoms; but at that distance from the land abreast of the San Bartholomeo river, is the outer edge of a shoal bank, on which a vessel is likely to be carried rapidly by the flood tide. It is the more necessary to be on the guard against this bank, as the coast line changes its direction rather more to the southward between Santa Barbara and San Bartholomeo rivers.

San Bartholomeo river.—This stream lies about 7 miles southeastward of the entrance to Santa Barbara river; the western entrance point is low and hardly distinguishable; the eastern point is higher and bluff. The entrance of the river does not open out until it bears N. 16° W. (north mag.). Within the river the land, when seen from the offing, appears

low, wooded, and detached like an island. Shoal ground extends 4 miles south from the entrance, close outside which the depth is 3 and 4 fathoms.

Sombreiro river lies 10 miles eastward of St. Bartholomeo river; it does not open out until it bears west of N. 8° E. (N. 23° E. mag.); on the western entrance point stands a clump of trees; the eastern entrance point also terminates in a clump of trees. There is a passage over the bar, but rendered dangerous by an extensive shoal off its mouth, on which a heavy sea breaks; this shoal, on the outer part of which there is a depth of 2 fathoms, extends 4½ miles off shore.

The Sombreiro river is not connected with the Niger river, but has its rise in latitude 5° 45′ N., and longitude 6° 55′ E. in lake Ikutta, where the Royal Niger company have a factory. From lake Ikutta the river, under the name of Oratshi, flows in a southwesterly direction for about 30 miles past Krikena, where there is a factory and a hulk which was brought through Ndoni creek from the river Niger to the town of Idu. Omoko, the chief town of Ebo district, is up a creek on the left bank of the river, about 5 miles above Idu and 2 above Krikena. From Idu, the river, which now takes the name of Engenni, continues in the same direction for about another 20 miles to within 4 or 5 miles of the Niger river in latitude 5° N.; it then turns to the SE. and is about 100 yards wide for the first 4 miles to Ogolokiama through open country, and then through dense mangrove bushes and very winding for 16 miles, to its junction with Sombreiro river opposite to Degama creek about 25 miles from the mouth of the Sombreiro. Degama creek, which is on the left bank of the river, though narrow and tortuous, carries 3 fathoms of water through it; this creek connects Sombreiro river with Bugama creek, and thus forms a means of inland navigation between Sombreiro, New Kalaba (Calabar), and Bonny rivers.

From August until the end of October, the river is at its highest, the estimated rise ranging from 6 feet at the entrance to 25 feet at Krikena. During this season a small handy vessel of 10 feet draft might descend from Degama to Ikutta lake. The river begins to fall rapidly after the 1st of November.

Factories.—There are factories at Degama, on the north side and at Abonema on the south side of Degama creek, where it joins the Sombreiro; also at Bugama near the junction of Degama and Bugama creeks, and at Bakana, about 9 miles above where Bakana creek joins Cawthorne channel.

Bar.—A heavy surf prevails on the bar which would apparently often prohibit access. Sombreiro river may be easily known by Fouché point, 7 miles to the eastward of it, on which are some detached lofty trees.

Least depth.—Two black nun buoys have been placed in 12 feet at low water to mark the channel leading into Sombreiro river; the outer buoy lies with West entrance point bearing N. 58° W. (N. 43° W. mag.) and

the inner buoy N. 39° W. (N. 24° W. mag.); the inner buoy lies with the south extreme of Fouché island N. 84° E. (S. 81° E. mag.) and the East entrance point N. 40° W. (N. 25° W. mag.). These buoys can not be depended upon.

When leaving the river, pass at about 200 yards from West point, and steer for the inner buoy, which pass close to, leaving it on the port hand; then steer a straight course S. 41° E. (S. 26° E. mag.) for the outer buoy, which should be passed close to on the starboard hand; between the buoys the depths range from 2 to 2½ fathoms; the two buoys should then be kept in line astern until the water deepens to 5 fathoms. (1887.)

If the buoys are gone, East point bearing N. 40° W. (N. 25° W. mag.) will lead through the channel.

Fouché point.—This point forms the western limit of a large bay, or estuary, into which the New Kalaba and the Bonny (or Obáne) rivers discharge their waters. It is low and swampy, the edge of the high and thick bush being 400 yards inside the point.

From Fouché point, the coast trends SW. for 2 miles to the eastern entrance point to Fouché creek, which is low and sandy; the bush being ⅛ mile from high-water mark. The outer edge of the surf extends 600 yards off Fouché point.

Yellow island.—This small sandy island lies in a north and south direction, with mangrove trees in the center about 30 feet high. It stands on the same large sand bank as the Breaker islands, but on the extreme western edge. It is situated N. 18° E. (N. 33° E. mag.) of Fouché point, distant 1⅛ miles.

Breaker islands are two low and sandy islands covered with grass and stunted bush about 10 feet high, and a few mangroves, with a sand bank 3 feet above high water nearly joining them.

Breaker islands are between Fouché and Rough Corner points, about a third of the distance from the latter, and are 2 miles long from NW. to SE., with an average width of 300 yards. The southeastern island has a flagstaff and a white house upon it, which is conspicuous from seaward. The eastern extreme curves round to northeastward, following the line of Bonny river, and leaving a channel between it and Rough Corner point one mile in width. These islands are continually altering both their shape and position. A signal station has been established to signal the approach of vessels.

Soundings.—The soundings in the vicinity of Breaker island have considerably altered. (1887.)

Rough Corner point.—This point forms the eastern limit of the estuary, and is 5¾ miles eastward of Fouché point. The bush extends close down to the sandy beach, and the point appears as a bluff when bearing from

N. 8° E. (N. 23° E. mag.) to N. 38° N. (N. 23° W. mag.). Ju Ju point lies about ¾ mile NE. of Rough Corner point.

Sand island.—From Rough Corner point an extensive sand bank stretches to the southward, on the western edge of which is Sand island, a narrow strip of sand, which at times appears above water, and then disappears below it, ½ mile long in a north and south direction. Its northern extreme is situated 1¾ miles S. 15° W. (S. 30° W. mag.) from Rough Corner point.

Tides.—Near Sand island both the ebb and flood streams set towards it.

Rough Corner spit.—This spit forms the southern edge of the sand bank off Rough Corner point, from which it is distant 3 miles in a southerly direction; from thence the line of shoal water turns to the eastward, forming the southern edge of Portuguese bank.

The intermediate space between Rough Corner spit and Rough Corner point is a long line of broken water.

The southern and western sides of Rough Corner spit are steep-to and must be approached with caution.

Portuguese bank.—This extensive flat (with from 13 to 18 feet water on it, hard sand) is the continuation to the eastward of the shoal off Rough Corner point, extending 4½ miles from the shore. It frequently breaks all over in the rainy season.

Outer Baleur bank, with from 6 to 12 feet on it at low water, is divided from Portuguese bank by a channel known as the Portuguese channel.

The bank is 2½ miles long from NW. to SE., with an average width of about 400 yards. The shoalest spot is on a sand head with 6 feet water, near the center of the bank, and from which Rough Corner point bears N. 9° E. (N. 24° E. mag.), distant 6 miles. From this spot a detached shoal of 10 feet bears N. 71° E. (N. 86° E. mag.), distant 1½ miles.

The whole bank breaks at half ebb, and in rough weather at all times of tide.

Inner Baleur bank.—This bank lies north from the Outer Baleur bank, distant ½ mile from its northern extremity. It is a narrow ridge of sand one mile long in a NNW. and SSE. direction, the shoalest part, 8 feet water, being near its southern edge, from which Rough Corner point bears N. 18° E. (N. 33° E. mag.), distant 4$\frac{8}{10}$ miles. A shoal of 17 feet water lies N. 7° E. (N. 22° E. mag.), distant ½ mile from the northern extreme of Inner Baleur bank.

In bad weather this bank always breaks heavily, and even in fine weather at half ebb.

Buoys.—A red buoy, surmounted with tripod and cage and moored in 4 fathoms water, marks the north extremity of the Inner Baleur bank.

From the buoy Rough Corner point bears N. 29° E. (N. 44° E. mag.), distant 4 miles.

A black conical buoy moored in 19 feet water marks the northwestern edge of Middle ground; from it Rough Corner point bears N. 29° E. (N. 44° E. mag.), distant 6½ miles.

Middle ground.—This bank, nearly 2 miles long from NW. by W. to SE. by E. with an average width of ½ mile, has 13 feet least water on it, and lies one mile westward of Outer Baleur bank.

The shoalest spot of 13 feet is near the center of bank, from which Rough Corner point bears N. 23° E. (N. 38° E. mag.), distant 6¾ miles, and Middle buoy N. 39° W. (N. 24° W. mag.), distant nearly one mile.

A patch with 17 feet water on it lies about ¼ mile to the NW. of the Middle ground. This patch has extended 600 or 800 yards in a northeasterly and southwesterly direction and about 400 yards in a northwesterly and southeasterly direction.

Western breakers.—These dangers, triangular in shape, separating Bonny and Fouché channels, are the continuation of the shoals and sand banks running SW. from Breaker island, broken only in one place by the Two Fathom channel. They always break heavily even at high water in fine weather.

The southwestern extreme is situated S. 40° W. (S. 55° W. mag.) of Rough Corner point, distant 6 miles and S. 27° E. (S. 12° E. mag.) of Fouché point, distant 4½ miles. From thence the line of breakers runs NE. for 2 miles as far as the Two Fathom channel, and the western edge in the direction of Fouché point for 2½ miles, then turning back ESE. for 2½ miles and forming the western side of the Two Fathom channel, thus enclosing a considerable area of broken water. On the eastern side of the Two Fathom channel the eastern edge of the breakers continues to run NE. by N., whilst the western edge extends in a NW. direction toward Yellow island, the whole of the enclosed space being a large flat, which breaks heavily at half tide, even in fine weather. It must be remembered that the flood tide in Fouché and Bonny channels always sets toward the Western breakers.

Fouché patches.—These patches have 5 and 6 feet water on them; the easternmost is situated one mile S. 15° W. (S. 30° W. mag.) of Fouché point. The three northern patches extend in a WSW. direction for 1,200 yards.

New Kalaba (Calabar) river.—The western bank of this river assumes a general NNW. direction from Fouché point, and is thickly wooded. The shore is fringed with mangroves in places, and elsewhere thick bush grows close down to the water's edge. Several creeks open into the river on this side, those by Fouché town and Young town being the most considerable.

Kalaba (Calabar) point.—The southern point of the eastern bank of New Kalaba river, known as Kalaba point, is N. 7° E. (N. 22° E. mag.), distant 2½ miles from Fouché point. From here a line of thick high mangroves extends NE. for 2¼ miles, to the entrance of False Kalaba.

The eastern bank runs from Kalaba point in a NNW. direction, and is lined with mangroves and thick bush. There are two creeks at ⅝ mile and 2¼ miles respectively above Kalaba point, which are said to lead into False Kalaba.

Mission houses.—Three white houses are situated on the eastern bank $1\frac{4}{10}$ miles above Kalaba point. They can be distinguished on a clear day from a distance of 7 or 8 miles.

Directions.—The direct channels into the New Kalaba river are seldom used since the opening of Cawthorne channel.

West Fouché channel.—This channel leads between Fouché patches and the land, in 12 feet at low water, but there are no marks, so the eye and lead must be the principal guide.

To enter.—Pass the breakers off the eastern entrance point of Fouché creek, at a distance of about 400 yards, and steer N. 35° E. (N. 50° E. mag.) for Fouché point, passing 200 yards northward of the westernmost of the Fouché patches, after passing which, alter course to N. 63° E. (N. 78° E. mag.) for the factories at Bonny, rounding the breakers off Fouché point (which are generally clearly seen) at a distance of 400 yards.

Fouché channel, leading westward of the Western breakers, is much obstructed by shoals of 8 to 9 feet water, which break at half ebb in fine weather. The whole channel breaks across in bad weather.

To enter.—The best mark for entering is the river bluff on east side of New Kalaba river, in line with the extreme of the sand off Fouché point, bearing N. 7° W. (N. 8° E. mag.), with the mission houses open eastward of the point; this leads through in 11 feet. When within 1¼ miles of Fouché point, haul up N. 18° E. (N. 33° E. mag.) for the western entrance of False Kalaba creek, passing about ¼ mile eastward of the breakers off Fouché point; thence the course is N. 30° W. (N. 15° W. mag.), 4 miles to abreast of Young town. Tumbo and Young towns should be passed at the distance of one mile to avoid offlying banks.

Two Fathom channel.—This is the only navigable channel over the flats between New Kalaba and Bonny rivers, carrying 12 feet at low water. The narrow part of the channel is ½ mile long, and about 100 yards broad, on the three distinct bars which have to be crossed.

Buoy.—A conical buoy, surmounted with staff and cage, is moored in 20 feet in the Two Fathom channel. From it Fouché point bears N. 50° W. (N. 35° W. mag.), distant $3\frac{1}{10}$ miles, and Rough Corner point N. 52° E. (N. 67° E. mag.), distant 4¼ miles.

To enter.—From a position 300 yards north of Baleur buoy a remarkable black clump of trees, having a sharp fall on the right, and sloping away gradually on the left, known as Mark tree, will be observed just open northward of the Two Fathom channel buoy, bearing N. 61° W. (N. 46° W. mag.). Steer for the buoy on this bearing which leads over the first bar; on deepening the water after crossing bring Mark tree in line with the buoy. After crossing the second bar bring Mark tree open southward of the buoy which leads over the third bar. The three bars are passed when the large clump of trees near Bonny town opens of Rough Corner point.

Having cross the bars, continue the same course, passing close southward of a shoal of 12 feet, ¾ mile N. 61° W. (N. 46° W. mag.) of Two Fathom channel buoy; when Yellow island closes the east bank of New Kalaba river, haul up N. 30° W. (N. 15° W. mag.) in mid-channel.

Boat channel.—This channel leads between New Kalaba and Bonny rivers, across the flats northward of Breaker islands and Yellow island. Pass about ½ mile north of the Breaker islands, steering for Yellow island, and when within one mile of the latter, and near the line of breakers off its southern extremity, steer for Kalaba point.

The most dangerous part of the flats is in this vicinity, and it usually breaks at half ebb.

Care is required in using this channel, as a beam sea is experienced the whole way, which sometimes unexpectedly breaks heavily. In bad weather it breaks all over and is quite impracticable.

Depth in river.—In December, 1872, H. M. S. *Pioneer* ascended above the hulks (moored on the west side of New Kalaba river 6 miles north of Fouché point) to New Kalaba town, a distance of 17 miles, and by keeping within ¼ mile of the western shore, a regular depth of from 4 to 6 fathoms was found.

The river above New Kalaba town is apparently much obstructed by shoals.

Bonny river.—From Ju Ju point the coast trends NE. by N. for 2½ miles to the factories and mission house of Bonny, a large native town. Several hulks lie aground on the bench. A new mission chapel has been built; the old one is now the telegraph station. King Amachri's town is 15 miles above Bonny town.

Okrika town is situated about one mile up the creek, which has only 6 feet at low water, and on the right bank a distance of 20 miles above Bonny town. Abreast the creek the river is about one mile wide, with a depth of 7 to 10 fathoms on the Okrika side, but a large mud bank, which dries, blocks the western half of the channel.

Peter Fortis point.—The east extreme of the coast, which divides the mouths of New Kalaba and Bonny rivers, is situated N. 26° E. (N. 41° E.

mag.) of Rough Corner point, distant 4¾ miles. On the extremity of this point are four round trees resembling haystacks when seen from a distance.

The bottom off Peter Fortis point is covered with long weeds, which are liable to choke the valves of steamers if the point is rounded too closely. There is a good place on this point on which to beach small vessels, if necessary.

Deadman island.—Deadman point, the southern extreme of Deadman island, is a round projection covered with mangroves nearly midway between Kalaba and Peter Fortis points, with False Kalaba river lying between.

Least depth.—In October, 1888, 12¾ feet was carried up the river for 18 miles above Bonny to the entrance of Okrika creek, and anchored in the center of the river in 9 fathoms of water to the north of mud bank. The depths varied from 13 to 6 fathoms, except abreast of Bolers creek, where a bar stretches across the river having a passage near its center of 17 feet water over it.

Trade is carried on between the Bonny and Opobo through Tullifer creek which connects the two rivers.

Telegraph.—Bonny town is in telegraphic communication with Harrison, Brass river.

Communication from Liverpool on alternate Wednesdays.

Tides.—It is high water, full and change, at Bonny town at 4h. 50m.; springs rise 6 feet, neaps 4 feet; the ebb stream sets over Baleur bank; the flood stream sets over the western shoals, but if the outside current is setting strongly to the eastward the flood stream will be but little felt. Near Sand island both ebb and flood streams set toward that island.

Anchorage.—The anchorage for men-of-war off Bonny town is in 10 fathoms, mud, at about ½ mile off shore, a little below Bolers pier.

Anchorage off Breaker island will be found an agreeable change to a vessel that has been some time in the river. Here there is generally a fresh sea breeze, and plenty of fish may be caught with the seine.

Outer anchorage.—A vessel should never anchor off the entrance of Bonny river in a less depth than 7 fathoms, and Fouché point should be brought to bear about N. 15° W. (north mag.) westerly; not less than 50 fathoms of cable should be veered.

NOTE.—The hard sandy bottom off this river extends as far as a depth of 6 or 7 fathoms. At this depth off the other rivers in the vicinity the bottom is invariably of soft mud. In thick weather the Bonny can be recognized by this peculiarity.

Pilots.—The duty of piloting is performed generally by the masters of merchant vessels engaged in the palm oil trade, who are far better acquainted with the navigation and more trustworthy than the native pilots. These latter are stationed on Ju Ju point, and, if it can be heard, the usual signal

buoys (if in position) will be found in this course at one and 3 miles, respectively, from the first mentioned. The deepest channel is at 100 yards southwestward of the buoys. When Peter Fortis point comes in line with the point eastward of Deadman island, the course should be altered for the middle clump of trees bearing N. 47° W. (N. 32° W. mag.), passing the breakers on the port hand at a distance of about 50 yards, and thence close to the shore near the clump. A mid-channel course may be taken until near the junction of the channel with New Kalaba river, when the north shore should be kept aboard to avoid a shoal lying northward of the south point of the entrance and marked by a red buoy. Here the channel is between the red buoy and the two black ones on the starboard hand, and is rather a sharp turn. Or a vessel may pass between the shore, which is steep-to, and the point with from 5 to 7 fathoms water, by keeping close to the point at from 15 to 20 yards from it; the width of the channel is uncertain. After rounding the point, gradually edge away from the port hand shore until abreast of a conspicuous scraggy bush, then turn slowly round and close the opposite shore, but not too close, as a spit extends from it, until abeam of a small ju ju house, and then keep a mid-channel course up to Bugama, keeping on the outside edge of any turns.

Bugama creek to Bakana.—The fishing stakes and mud flats which can be seen are a fair guide for piloting. As a general rule, where there are low bushes of a light-green color with a straight bank, deep water will be found close-to, and high trees with swampy ground should be kept clear of. A pilot should be taken and the lead constantly hove. The temperature of Bakana on the 24th of March was 92½° in the shade. Mosquitos swarm off to a vessel at sunset.

Least depth is 3 fathoms.

Anchorage.—A fair anchorage out of the strength of the tide may be found with the outer buoy in line with the flagstaff on Breaker island, S. 46° W. (S. 61° W. mag.), clear of the buoy in 7 or 8 fathoms of water. A ship at anchor obstructs the channel which is narrow.

Coast.—From Rough Corner point the coast trends SSE. one mile and then turns east; it is low, swampy, and covered with mangroves, palms, oaks, and such trees as grow in brackish water. Fertile land, more elevated above the sea, lies several miles inland.

When running along the coast between Bonny and Opobo rivers, vessels should keep outside the dept of 8 fathoms.

Antonio river.—Eastward of Rough Corner point, distant 15 miles, is situated Antonio river, or, by corruption, the Andoni. The mouth is obstructed by sand banks, which permit a passage for boats only.

Opobo river, lying 17 miles eastward of Antonio river, is difficult to distinguish until the mouth of the river is open and Foster clump made out, when the white factories with galvanized iron roofs on the east bank,

1½ miles within the entrance, are seen; they are visible in clear weather for 6 or 7 miles.

The Opobo appears to have its source, like the Sombreiro, in lake Ikutta and receives on its left bank several narrow but deep and navigable affluents. At 40 or 50 miles in a straight line from the coast it flows not far to the westward of the large and populous town of Benda, which is a great trading center for slaves and ivory.

The Opobo leads into the heart of the Opobo country, which is densely populated. The people are cannibals, but not of a ferocious type; their towns are crowded, but have open spaces in them which are kept very clean. In the vicinity there are dense groves of oil palm and thriving plantations of maize, yams, beans, and colocasia arums.

On September 27, 1889, H. M. S. *Alecto*, drawing 8 feet 3 inches, proceeded up the Opobo river for about 19 miles as far as the flats, having rather shoal water at half tide after passing the first island. The next day the flats were crossed at high water springs, the least water being 9 feet, the only time they are passable to a vessel of the *Alecto's* draft. It is not certain whether she could cross at high water neaps or in the dry season without being lightened. There are several deep holes on the flats where vessels can lie at anchor at low water. When crossing the flats the left bank of the river should be hugged closely. Azuminé creek on the left bank of the river is about 25 miles from the mouth; the creek is narrow, but deep, with a strong current, and at present much encumbered by snags. At about one mile above Azuminé, or 4 miles above the flats, the river widens, having a shoal of about ½ mile in extent in it, and as the tide was not at its highest, there was little water to spare over it. The tide reaches this far up the river. Above this shoal for about 6 miles to Ohombela creek the river presents no difficulties; in the wet season, however, owing to the current, the river should not be ascended beyond this creek. From Ohombela creek to Akwita creek the river is narrow and full of sharp turns, rendering it difficult to keep clear of the bushes on the banks, which are steep-to. Akwita, where Miller's factory is established, is a short distance from the river, being reached like nearly all the other towns by a creek. The town is hidden from the river by jungle; it is a considerable place, consisting of a collection of villages amidst high trees and plantations.

At about 9 miles above Akwita creek there is a small but convenient creek called Asa, where a factory will probably soon be established; Obako, a small village which is up this creek, was visited. A market is held here by Bonny men, who, at present, monopolize the trade. The produce goes down the river and through Tullifer creek to Bonny. The town of Asa, which is a short distance higher up the creek, is about 5 miles overland from Akwita; it is reported to be rather an important place. The river above Akwita creek runs very swiftly at this time of year; it is described

as being deep and clear of shoals, but encumbered with snags, and the bends in it are so sharp that it is only fit for a large steam launch to navigate. The banks of the river to a short distance beyond Akwita creek consist of a fringe of impenetrable marshy jungle, with many creeks; above this and as far as the Opobo has been explored the jungle is succeeded by open country.

At about 12 miles from the mouth of the Opobo, Ogoni creek branches off to the westward. It is a fine deep stream for about 10 miles; it was traversed in the steam cutter, running between banks, with the oil palm growing in abundance; the natives, however, do not extract the oil, but confine their labors to agriculture and fishing. Probably this river is connected with St. Antonio and Bonny rivers, and may prove of great importance in improving the inland navigation of the country, as trading steamers are hampered by the Opobo bar, which could thus be avoided.

Climate.—In the upper portion of the river above the mangrove swamps, the climate is cool, and it is free from mosquitoes and sand flies. There was no serious sickness among the *Alecto's* crew, the river being more healthy higher up than lower down.

Positions.—Latitude of the factory at Akwita, 4° 58′ 30″ N.; longitude, 7° 18′ 40″ E.

Latitude of the beacon at entrance of river, 4° 27′ 30″ N.; longitude, 7° 33′ 21″ E.

Opobo, a not very large but packed and squalid town built by King Ja-Ja in about 1870, is on the right bank and distant about 4½ miles above the factories, which, from its position with respect to Tullifer creek leading to the Bonny river, entirely commands the approach to that river. There is considerable trade on the river.

Factories.—Five factories are situated on the east bank of the river abreast Sandy point; that belonging to Messrs. Miller is on the opposite side.

During 1888, European establishments have been placed at Esene, Obako, Ohombda, and Akwita, all of which places are connected by water with the Opobo.

West point.—This point forms the western entrance point of the river, from which the coasts trends NNE. for a distance of 2¼ miles to Sandy point, on which stands Sierra Leone town, chiefly composed of native huts, with one or two white oil sheds. From Sandy point, the line of the river turns abruptly NW., with an average width of ¾ mile, both shores being lined with impenetrable mangroves.

East point.—This point, forming a tolerably sharp elbow, lies NE. of the beacons on West point, distant 1½ miles. From East point, the river bank trends N. ½ E. for one mile to the factories abreast Sandy point, where the stream is ½ mile broad. From the factories the river bank curves round to the northwestward, which direction is continued as far as Opobo town.

Bar.—The bar of Opobo river is very shoal, and breaks all over in bad weather.

The bottom is of sand everywhere on the bar, changing to mud on either side. The bar is said to frequently shift its position.

From West point shallow water extends southward for nearly 2 miles, and then gradually curving round to the eastward meets the shoals running southward from Eastern spit, thus forming the bar.

The shoalest part is on a large patch ⅛ mile long by about 300 yards broad, with from 4 to 5 feet on it at low water, and lies S. 18° W. (S. 33° W. mag.), distant 1½ miles from the beacons on West point.

Another smaller patch of 4 feet water lies ¼ mile S. 72° E. (S. 57° E. mag.) of the larger patch, and a small sand head of 6 feet depth is ⅛ mile S. 27° E. (S. 12° E. mag.) of the latter. Patches of 6 feet at low water extend SSW. from West point for nearly a mile. These patches break at half ebb even in the finest weather.

To the westward of the Direct channel the general depth on the bar is 7 feet at low water, and the same for a distance of ½ mile to the eastward of this channel, but further to the eastward the depths gradually increase, reaching the maximum of 10 feet on the leading mark for the East channel, and decreasing to 8 and 9 feet when yet more to the eastward.

Least depth.—The *Goshawk* never entered the river before half flood and the least water on the bar was 15 feet. The *Bramble*, drawing 12 feet 4 inches, in 1888, high water springs, got one cast of 15 feet.

Eastern spit.—This spit extends in a SSW. direction from East point for 1½ miles, leaving a deep channel between its western edge and the west bank of the river, ⅛ mile broad.

It is nearly dry at low water springs, and always breaks very heavily on the outer edge. The western and northwestern edges are steep-to, but it shelves very gradually on the south and southeastern sides, with heavy rollers for a considerable distance even in smooth weather.

Sailing vessels, if rounding Eastern spit to closely, are liable to be swept on to it, during the flood tide, and an anchor will not readily hold when among these rollers.

Beacons.—On West point is a white conical beacon, 120 yards from the beach. (Disappeared 1889.)

Buoys.—A black fairway buoy in 3¾ fathoms, lies on the inner edge of the bar, with West point beacon bearing N. 31° W. (N. 16° W. mag.), distant ¾ mile. (Not in place 1889.)

A black conical buoy, surmounted with staff and ball, is moored in 10 feet water, marking the southeastern edge of the shallow water extending from Eastern spit. From this buoy the beacons on West point bear N. 50° W. (N. 35° W. mag.), distant 1½ miles. The buoys are not to be depended on.

Directions.—Direct channel.—To enter make the river and houses on the east side of it from the offing before standing in, then stand in with the left hand of all the houses on the east side of the river just open of the East point until West point bears N. 39° W. (N. 24° W. mag.), when steer direct for it until the water deepens to 6 fathoms; then stand up for the factories. It is not advisable to take this channel without a pilot. The sea is end-on to a vessel when in the channel.

Eastern channel.—Miller's factory (on western bank of the river), bearing N. 7° W. (N. 8° E. mag.), leads through in 10 feet at low water springs. When West point bears N. 44° W. (N. 29° W. mag.) haul up for it. This mark leads south of Eastern spit; and when Foster clump comes in line with the right extreme of Sierra Leone town, haul up in mid-channel for the factories.

The Eastern channel is much wider than the Direct channel, but it has the disadvantage of a beam sea; the bar is a mile wide, but the channel when buoyed is recommended for strangers in preference to the Direct channel. The best time for entering is at the last quarter of the flood.

Anchorage.—Vessels should anchor in 8 fathoms, stiff mud, off the Factories. Mooring buoys are laid down off the different wharves for the convenience of vessels belonging to the traders.

Outer anchorage.—The usual anchorage outside the bar is in about 5½ to 6 fathoms, about 4 miles south of West point, from which anchorage the factories will be clearly seen. The prevaling current being to the eastward, vessels nearly always lie broadside to the swell.

Pilots.—When requiring a pilot, the fore top gallant sail should be loosed as a signal. The best pilots are the masters and mates of the branch steamers.

Communication.—Branch steamers run weekly between Bonny and Opobo rivers, and may be expected a day or two after the arrival of the English mail at the Bonny river.

Caution.—Great care should be taken at all times when standing in for Antonio and Opobo rivers, as shoal ground extends several miles off shore between them, and the flood tide often draws a vessel in at the rate of 2 miles an hour; all danger may, however, be avoided by paying attention to the lead, and not shoaling the water under 7 fathoms.

Tides.—It is high water, full and change, in Opobo river at about 4h. 30m.; springs rise 7 feet, neaps 5½ feet. The tidal streams set fairly into and out of the channels over the bar.

False Kwoibo river.—At 6 or 7 miles to the eastward of Opobo river is the entrance to False Kwoibo river. There is apparently a boat channel across the bar, but breakers extend for at least 2 miles off shore. Boats can pass to Opobo river through creeks, which abound with sea birds. Near

the mouth, hippopotami are numerous, and on the strip of bush at the west side of the entrance, deer, monkeys, and pigeons are plentiful.

Kwoibo river, the mouth of which is situated 19 miles eastward of Opobo river, is entered between a bluff point on the west and a low point which bears NE. from it, distant ½ mile.

An umbrella-shaped tree is situated on the shore about ½ mile west of the west entrance point, and at 3 miles west of it there is a group of three trees.

Factories.—There are three establishments on the Kwoibo, belonging to the Liverpool African company.

Depth on bar.—From both these entrance points shoals extend about a mile to the southward, between which there is a channel with a depth of 6 feet in it at low water.

The best channel across this bar is found by steering for the bluff point when bearing N. 50° W. (N. 35° W. mag.). When across the bar the depth increases to 2 fathoms, which is maintained up to the anchorage off the factory, situated 3½ miles within the entrance.

Coast.—From Kwoibo river the coast, retaining the same general features, trends eastward for about 21 miles to Old Kalaba river.

Old Kalaba (Calabar) river.—The entrance to this river (known also as the Oiòne by the natives) lies between Tom Shot point on the west and Bakasi head on the east, the latter bearing S. 63° E. (S. 48° E. mag.), distant 13¼ miles from the former.

There are some large and important towns and settlements on the upper Old Kalaba. A considerable trade in palm oil and ebony is carried on in this river, the principal trading post being at Duke town, situated on the eastern side, 25 miles within the entrance, and off which large vessels frequently lie for many months. Old Kalaba contributes a larger share of the trade than any of the settlements on the Oil rivers.

Tom Shot point, the west entrance point, is long, low, and sandy, being covered with bushes. Northward of this point the coast recedes and forms a bight, the northern point of which is slightly elevated and covered with trees; this part of the coast is fronted by an extensive shoal bank of black sand and mud, known as Parrot spit, which nearly dries at low water.

Parrot island, covered with high mangrove trees, is on the west side of the channel about 12 miles north of Tom Shot point; it is of a round form and about 1½ miles in diameter.

Tobacco head, on which are some large trees making like a bluff, in shape similar to a boat's rudder, is 3¾ miles N. by W. ½ W. of Parrot island.

Alligator island, on which are some remarkable round trees, covers at high water; it is on the west side of the channel 5 miles NNW. of Parrot island; between these islands an extensive bank known as James flats

extends from the western shore; when SE. of Parrot island care must be taken not to mistake this island for Tobacco head.

Duke town, on the eastern side of the river 5 miles NE. of Alligator island, is situated between two high hills. There are several English factories here and a few houses belonging to the principal chiefs, but the town is badly kept and very dirty. The town will not be seen until nearly abreast of it. Henshaw town stands on the top of the hill just below the first factory. Supplies are scarce and the beef inferior.

The eastern side of Old Kalaba river is intersected by numerous creeks and small rivers, fronted by mud flats, which nearly dry at low water.

Communication.—Mail steamers leave Liverpool on alternate Wednesdays for Old Kalaba.

Climate.—From its position and relative healthiness this place promises to become an important trade center. December, January, and February are the unhealthy months.

Creek town.—The river is reported as navigable for 15 miles above Duke town with not less than 15 feet of water. Vessels seldom go above Duke town, 2 miles north of which, on the same side of the river, is Old town. These towns stand on tolerably high and well-wooded ground. At 2 miles above Old town a creek on the western side of the river leads to Creek town. At 20 miles above Duke town the width of the river is only 20 or 30 yards and the depth about 6 feet.

Seven Fathom point, on the eastern side of the river opposite Alligator island, may be recognized from its being covered with high straight mangrove trees. Rocks are reported to exist north of this point.

James island, separated from the main by a deep creek, forms the eastern side of the channel opposite James flats; it is 1¼ miles north of Parrot island.

Bakasi head is the east entrance point, and immediately east of it is Bakasi gap, which is very conspicuous, and will first attract attention from seaward when making the land to the eastward of the river. The opening is about ⅓ mile in width and is the entrance of a creek which communicates with Bakasi river.

Tom Shot breakers, the southern termination of the shoals on the western side of the channel into Old Kalaba river, lie S. 4° E. (S. 11° W. mag.), distant 9½ miles from Tom Shot point; the least water on them is 7 feet, and in fine weather they only break near low water; from their southern extreme Bakasi head bears N. 66° E. (N. 81° E. mag.), distant 10⅓ miles. The existence of the breakers is doubtful.

A narrow reef of breaking rocks, about 3 miles in length in a north and south direction, lie on the western side of the channel, 1¾ miles north of Tom Shot breakers.

Buoys.—In March 1890, there were but two buoys in the river, the south one black, the north one red.

Caution.—The position of the buoys is not to be depended upon.

In the rainy season all the rivers are often obscured by thick weather from seaward, even when in only 5 fathoms of water.

Channel.—The fairway channel east of Tom Shot breakers is 3½ miles wide, maintaining that breadth for about 11 miles in a northerly direction, beyond which it is much narrower; SW. 2¼ miles of Parrot island there is a detached shoal of 15 feet in the middle of the fairway. At ½ mile from Tom Shot point, and inside all the breakers, there is a channel with not less than 8 feet at low water springs.

Approach from westward.—In approaching Old Kalaba river from the westward great care must be taken to avoid Tom Shot breakers and other shoals westward of them. Should a vessel which is not sure of her position find hard bottom, it would be prudent to haul to the SE. and make the land about Bakasi gap, where a bearing of East head, if it can be seen, will assist the vessel in ascertaining her true position; the weather is generally so hazy that the mountain peaks can not be seen except after a tornado. On making Bakasi gap from the westward do not bring it to bear east of N. 53° E. (N. 68° E. mag.), which will lead south of the shoals before mentioned; with the gap on that bearing, in the depth of 3½ or 4 fathoms, the vessel will be in the fairway for entering the river. If at this point a tornado should threaten, it is advisable to anchor until it blows over; on this part of the coast they usually come from the southeastward.

From Bonny river to Old Kalaba river.—When well clear of Bonny bar steer S. 83° E. (S. 68° E. mag.) for 48 miles, until the trees along the shore have nearly disappeared below the horizon, or until the depth of 15 or 16 fathoms is reached; then steer N. 86° E. (S. 79° E. mag.), when the water will gradually shoal from 15 to 12, 10, and 8 fathoms over a mixed bottom of black sand and mud. As Old Kalaba river is approached, the bottom becomes hard and composed of bright sand, until east of Tom Shot breakers, when it will be muddy.

Caution.—Care must be taken not to approach Tom Shot point or the western shore of the river entrance nearer than just to sight the trees upon it from a height of 24 or 26 feet above the sea, and should the water shoal to 6½ fathoms on hard ground, stand out until it deepens to 8 fathoms. By no means come into a less depth than 6½ fathoms over any description of bottom whatever until East head bears N. 30° E. (N. 45° E. mag.) or Bakasi gap N. 35° E. (N. 50° E. mag.); the vessel may then stand toward East head into 5 fathoms, muddy bottom, when, if necessary, anchor and send a boat up the river for a pilot.

Attention to the above remarks will take a vessel clear of the breakers at the western side of the approach to Old Kalaba river.

From the eastward.—Great care, with attention to the lead, is required to avoid the shoal with less than 18 feet on it at low water, which extends for 6 miles southwestward from Bakasi head.

Depths.—The best time for going up to Duke town is to enter the river about 3 hours before high water at Duke town, when 4 fathoms should be carried as far as Monkey creek. At low-water springs there is not more than 2 fathoms when crossing over to Duke town anchorage.

To enter.—Vessels intending to proceed into the river, having made sure of their position off the entrance by bearings or by sighting Tom Shot breakers, should steer in N. 2° E. (N. 17° E. mag.), passing one mile eastward of those dangers, and taking care to guard against tidal influences, as the streams have been kown to set both NE. and SW. across the breakers, remembering also that, as a rule, should the weather shoal with hard bottom, the vessel is too far to the westward; if with muddy bottom, too far to the eastward.

This course, N. 2° E. (N. 17° E. mag.), will lead close east of buoy No. 1 off Tom Shot point; when off this buoy, a N. 13° E. (N. 28° E. mag.) course may be steered for 5½ miles to make buoy No. 2. Passing west of this buoy at a distance of ¼ mile, steer N. 26° W. (N. 11° W. mag.), with the entrance of Great Kwa river (which may be known by its eastern bank showing as a green point sloping down to the water's edge) kept rather on the starboard bow, allowing half a point leeway for the ebb or flood streams. When Tobacco head is open east of Parrot island, bearing N. 43° W. (N. 28° W. mag.), steer for it, which will lead over the tail of Parrot spit and the 15-foot patch; then steer close along the eastern side of Parrot island until Seven Fathom point, on the eastern side of the river, opens west of James island bearing N. 26° W. (N. 11° W. mag.).

In thick weather, when off Parrot spit, should the water shoal with hard or sandy bottom, haul more to the eastward; if with soft or muddy bottom, more to the westward.

A direct course from Parrot island should be shaped from James island, keeping close to its westward side, after passing which, keep James and Parrot islands just touching; this course will lead east of James flats in 18 feet at low water. Pass close round Seven Fathom point (rocks have been reported north of this point) and keep on the eastern side of the river (to avoid a long shoal on which there is only 3 feet water, lying in mid-channel), until abreast of Fish town on the western shore, when the river must be crossed to avoid a ledge of hard ground which fronts the eastern shore, and the western side of the channel should be kept near as far as the opening of Monkey creek and Duke town is nearly abeam, when cross again to the anchorage on the eastern side.

For clearing the NE. side of the shoal lying in mid-channel to the northward of the point, the trunks of two trees, one on each side of the river,

and bearing about N. 8° E. (N. 23° E. mag.) and S. 8° W. (S. 23° W. mag.) of each other, have been painted white. Each tree has a band of red in the middle of the white, but the color is liable to be altered.

Vessels from Seven Fathom point may stand over for Cross river, and, keeping on the western shore, pass westward of the shoal in mid-chanuel until just past Monkey creek, then cross over and anchor in from 4 to 7 fathoms water. This channel is generally used by the local pilots.

Where Cross river joins the main stream there is a shoal of mud with 10 or 11 feet on it, extending from the north entrance point, toward which the ebb stream out of Cross river inclines to set a vessel, if not under command.

Fresh water.—The water at Duke town is fresh, but not fit for use. There is a small watering place at Old town.

Tides.—It is high water, full and change, at Duke town at 5h.; springs rise 6½ feet, neaps 5 feet. The general velocity of the tidal stream is 2½ to 3 knots an hour at half tide.

Cross river.—The main stream of the Old Kalaba, which a vessel ascending to Duke town leaves at Seven Fathom point, continues above Tobacco head to the NW. under the name of Cross river.

The lower reach of this river above its junction with the Old Kalaba river at Alligator island, was found to have only a depth of from one to 2 fathoms in it at low water (November), the banks being low and level, but in September, 1842, by passing into Cross river through the creek situated immediately south of Fish town, a depth of from 4 to 7 fathoms was maintained, and deep water was found nearly as far as Ethiope rapids, a distance of 200 miles from the sea, the river being generally from 200 to 300 yards in breadth. At Ethiope rapids the progress of the small steamer in which these discoveries were made was stopped by the rapidity of the downward current, but smooth water was found to extend for some distance above this point.

Depths.—The river varies considerably in depth, according to the seasons; it is navigable at all times for vessels drawing 3½ feet as far as Ethiope rapids. The river is highest in September, and during the rains from the end of June to November, rises nearly 20 feet above the dry season limit.

Leaving Old Kalaba river under sail.—When descending the river from Duke town, the same track should be pursued as that previously described, as nearly as circumstances will permit; if the wind be contrary, which it generally is, the ebb stream is strong enough for backing and filling where the channel is narrow.

Caution.—At the bar the tidal stream does not run more thau a mile an hour during the dry season, the flood generally setting toward Tom Shot point, and over the shoals to the westward. Particular attention

must be paid to the tidal stream when beating out with the ebb, or at any time with light winds.

Bakasi gap to Rio del Rey.—After clearing Old Kalaba river and having passed Bakasi gap, a S. 83° E. (S. 68° E. mag.) course for 10 miles along the southern edge of the bank extending 7 or 8 miles SW. of the peninsula of Bakasi brings a vessel to the western entrance of an extensive, open, shallow bay, 13 miles wide, into which several small streams fall, the western and largest of which, known as Rio del Rey, is 4½ miles wide at the entrance, but rapidly decreases into a narrow channel. The coast of the bay on the eastern side slopes from the lofty Kamerun mountains, and on the western side it is formed by the SE. extreme of Bakasi peninsula. The shores are thickly peopled, the inhabitants appearing to be principally employed in fishing.

Rio del Rey.—In October, 1885, the Imperial German Corvette *Habicht* anchored off this river in 3¼ fathoms, mud, with mount Kamerun bearing S. 71° E. (S. 56° E. mag.) and the peak of Fernando Po S. 4° E. (S. 11° W. mag.) afterwards proceeding into the river and anchoring in 6 fathoms about 16 miles from the mouth. Here the river divided into two equally wide streams, one running northward, said by the natives to lead to Kalaba, and the other northeastward.

Villages.—The native villages are large, and, unlike those further south, are built on the shores of the bay, and exposed to view from the water. This feeling of security is produced by vessels having seldom sought slaves in the river; nevertheless these natives are a timid race, and there is great difficulty in holding any intercourse with them.

Coast.—At 9 miles eastward of Rio del Rey, the line of coast, after having continued in nearly an east direction from cape Formoso for 170 miles, turns abruptly to the southward along the foot of the Kamerun mountains. It is principally formed by low cliffs, hollowed in many places so as to form caverns, and at one part there are two rocky cliffs at some distance apart, connected by a gallery, perforated at equal distances by a line of apertures, resembling the work of an engineer in the excavation of a fort.

Bombo Betika point, about 12 miles southward of Rombi village and 1½ miles northward of Madale de Coto point, is the termination of a ridge of hills, which is the boundary line of trade in these parts; that to the northward going to Old Kalaba, and that to the southward to Bimbia.

Bibundi bay, on the western side of mount Kamerun, is 10 miles across, and formed by cape Mawonge, or Madale de Coto point, on the north, and Debundga point on the south. Off Madale de Coto point, a reef with several rocks above high water (the highest showing 4 feet) extends to the SW. for 1½ miles; the shallow sand banks extend for 2 or 3 miles farther westward; the shore of the bay from the point to Bibundi river for about

3 miles to the southeastward is black mud with mangrove bushes, and from the river to Debundga point it is rocky. The river, which is difficult to make out from seaward, has a narrow entrance between a steep rocky bank on the south side and a sandy spit on the north, is always accessible for small boats, but a steam launch drawing 5 feet would have to wait until half flood. Just within the entrance the river forms a small harbor of about an acre in extent. Bibundi, a native village, about 200 yards from the beach, is concealed by the trees. This village is the center of trade for the country to the west of the Kamerun mountains, and for some distance northward. Southward of the mouth of the river there is a Swedish factory, which is a white house with a black building behind it.

If entering the bay from the southward, vessels should not come nearer the shore than one to 1½ miles, and not into less than 5½ fathoms water. There is very good anchorage off the factory in 6 fathoms of water on a muddy bottom, at about 1,400 yards from the shore. To show the position of Bibundi, a beacon of stone and iron, about 55 feet above the sea, has been erected on Observatory point.

Debundga point is a bold headland terminating in cliffs of a reddish limestone from 40 to 50 feet high.

Lavati point, about 2½ miles to the SE. of Debundga point, when seen from either the eastward or westward, appears as a well-defined bluff, with a reef which shows at low water, running off for about 100 yard with probably sunken rocks extending beyond it.

Anchorages.—Off Ngdondge village, at southern portion of Bibundi bay, in 9¾ fathoms water, sand and mud bottom, with Debundga point bearing S. 10° W. (S. 25° W. mag.), and the village N. 77° E. (S. 88° E. mag.).

Off Bakinki village at ½ mile from shore, in 9 fathoms water, with a rocky and uneven bottom, Lavati point bearing N. 64° W. (N. 49° W. mag.), distant about 1½ miles. The village is about a mile inland. There is very good landing in a small bay close to where a stream runs into the sea.

Off Batoki village, at about 1½ miles westward of Limboh point, in 10 fathoms water, on a muddy bottom, with Hulk rock which is 50 feet high and 30 yards off shore, to which it is joined by a reef of rocks, bearing N. 53° E. (N. 68° E. mag.), and Limboh S. 77° E. (S. 62° E. mag.). The village can not be seen from seaward. The landing is bad, but the best place is about 50 yards westward of Hulk rock.

Kamerun mountain.—The base of this mountain occupies a space of nearly 20 miles in diameter, the highest peak, named Mongo-ma-Loba, being 13,760 feet above the level of the sea; it is covered with trees of luxuriant growth nearly to the summit, but one bare brown ridge, extending from the eastern side toward the sea, when seen from a short distance,

appears to be composed of lava. The peak of Kamerun stands so boldly above the surrounding pinnacles that the descent seems unbroken, giving to the whole the appearance of one vast mountain rising from a single base, although a peak, about 2 miles inland, and 7 miles NW. of Ambas bay, named Mongo-ma-Etindeh, or Little Kamerun, rises to a height of 5,820 feet.

Rombi mountains, lying 30 miles north of Kamerun peak, are seen towering in rude and rugged masses, affording a contrast to the apparent regularity of Kamerun mountains; their height must be considerable, as they are perceived when more than 60 miles distant.

Kwa mountain.—This mountain 65 miles north of Kamerun peak, is also of great elevation, and can be discerned from a distance of nearly 80 miles. Most of the above mountains are extinct volcanoes, as well as the island of Fernando Po.

Ambas, or Amboise bay.—On the southern side of mount Kamerun, at the base of the peak of Mongo-ma-Etindeh, is Ambas bay and islands.

The northern coast of Ambas bay is formed by several bights, the dividing points between which are fringed by offlying rocks; the eastern coast is formed by a peninsula 2½ miles long, on which there are four hills.

Morton bay, in the northeastern corner of Ambas bay, is accessible only to boats, being fronted by rocks.

For passing between the reefs, two beacons have been put up on the point of the SE. shore, carrying two white squares, and also two beacons on the NE. shore, surmounted by two triangles having their bases turned to each other. In entering, the first mentioned beacons should be kept in one until the last two come on with each other, then keep them so to the landing.

On the northern side of Morton bay is the missionary settlement of Victoria, at which small supplies can be procured.

Beacon.—A beacon has been placed on a rock in the middle of Morton bay, which lies in the fairway to the landing place.

Mondoleh island.—In the bay of Ambas are three small islands, the largest, Mondoleh, at the SE. part of the bay, is only ½ mile long, about 200 feet high and rocky, but with a level surface of rich soil, composed of decomposed basalt; the steep sides of the island are clothed with wood. There are three or four springs of water halfway up the side of the island, which, though scanty, are said to flow always. The landing is bad, but capable of improvement.

Ambas island.—The outer or western island, Ambas, or Domeh, is smaller than Mondoleh island and nearly barren; the rocky slopes and summit are only clothed with a ltttle brushwood and grass. It is in fact a narrow ridge of rock, elevated at the southern extremity. Many goats and pigs feed on the precipitous sides of the island.

Landing place.—The only landing place at Ambas island is difficult of access, on account of the rugged rocks and incessant swell, it lies near the north extreme of the island; a good pier, however, might be made with very little trouble. There is only one scanty spring of fresh water, which is occasionally dry; the inhabitants must therefore catch rain water, and during the dry season obtain supplies from the main land.

Bobia island.—This island, known also as Pirate island, from the supposed disposition of its natives, lies 1¾ miles N. 24° E. (N. 39° E. mag.) of Ambas island; it is even more barren than the other islands in this bay, and probably formerly joined the adjacent perpendicular cliff on the mainland, as the geological structure is similar, and between them there is but a narrow channel. The process of destruction of this cliff is still going on, as enormous fragments of recently fallen rocks are lying at the north extreme of the island. Although Bobia is much smaller than the other two islands in Ambas bay, it is densely peopled, almost every available spot on its rugged surface being occupied by a hut. It is perpendicular on all sides, and the only access to the summit is by clambering up what appears to be the projection of a basaltic dike—a path available only for one at a time. The inhabitants, probably, owe to their impregnable position the bad character they have among their neighbors.

These islanders are the principal fishermen of the bay, which in fine weather they cover with their light canoes. This enables them to obtain by barter from the mainland, with which they are in constant communication, the scanty clothing they require, and supplies of yams, plantains, etc.

Pirate rocks, some of which are above water, extend ½ mile SSW. from Bobia island, with 7 fathoms close to the southern edge.

Anchorage.—The anchorage is excellent in all parts of Ambas bay, with good holding ground and a depth of 6 to 7 fathoms; although it forms a lee shore and there is an incessant swell, the wind is said to seldom blow home so as to endanger vessels. The prevalent wind is from SW., to which the bay is quite open, and the most stormy months are considered to be July and August.

This is a secure anchorage all the year round; and although several severe tornadoes were experienced by H. M. S. *Flirt* in March and April, that ship did not once drag her anchors.

During the tornado season, March, April, May, and October, it is advisable to anchor with the SE. point of Mondoleh island to the westward to S. 30° W. (S. 45° W. mag.), and at some distance from the island, so that it should not be under the lee during tornadoes, which blow hardest from the NE.

During the rainy season, June, July, August, and September, the best anchorage is close to the NE. end of Mondoleh island, to avoid the swell setting in from the SW.; but during both seasons the southern point of Ambas island should be shut in by the northern point of Mondoleh.

Climate.—Although the settlement of Victoria may be considered unhealthy, owing to the swamp close behind it, the anchorage appears to be quite healthy, and only two slight cases of fever occurred on board the *Flirt* during her stay from March 25 to April 20.

The adjacent mainland is nearly devoid of mangrove and swamp; and as the land wind passes over the lofty Kamerun mountain, the night air is rendered cool and refreshing. Indeed, from the peculiarity of its situation, and from local circumstances, Ambas bay will probably be found one of the most healthy positions on the west coast of Africa.

Land and sea breezes are experienced, the former during the night and the latter during the day.

Tornadoes.—These ordinarily occur about once in twenty-four hours during the rainy season, the rest of the day the weather being generally fine; occasionally there are days without rain at this season.

Supplies.—Wood, and generally livestock, may be obtained in abundance, the latter being much cheaper than at Fernando Po. Yams are plentiful and good, but vegetables scarce.

There is a little difficulty in obtaining a regular supply of fresh beef, owing to there being no contractor at Victoria, numerous herds of cattle and sheep are bred in the vicinity.

Good water may be obtained in a bay on Monanga peninsular, ESE. from the south point of Mondoleh island.

Excellent water can also be procured near Kieh, $1\frac{1}{10}$ miles west of Victoria, but only at low tide, as the water gushes out at the foot of a rock. By excavating, however, above high-water mark, a convenient watering place might be made.

Exports.—The principal exports are palm oil and India rubber, which might be increased to a much larger extent than at present. The forests abound in good timber, and there is water power in the brook at Victoria to work a sawmill.

Tides.—It is high water, full and change, in Ambas bay at about 5h. 15m.; springs rise 7 feet, neaps 5 feet. The tide appears to run both ways for an equal period, the flood setting south and the ebb to the north.

Coast.—Eastward of Ambas bay the coast recedes and forms a bight about a mile deep, at the western part of which there is a long inlet.

Cape Bimbia forms the southern extremity of the base of Kamerun mountains, the land above it rising gradually and regularly from the sea.

Nicoll island, $1\frac{1}{2}$ miles eastward of cape Bimbia, lies $\frac{1}{2}$ mile from the shore, on the western side of the mouth of Bimbia river. Between it and the mainland on its western side is a sheltered anchorage off King William town, but which has only a depth of $2\frac{1}{4}$ and $2\frac{3}{4}$ fathoms; there is a watering place about $\frac{3}{4}$ mile to the northward of the town.

Nicoll island is thickly wooded, and has a shoal bank extending from its

western side; the north and south extremities of the island are moderately nigh, with a low plain between them.

Bimbia river.—This river, the entrance to which lies about 1½ miles NE. by N. of Nicoll island, is about ¾ mile wide at its mouth; the channel is obstructed by a bar, on which there is only a depth of 18 feet. Inside the bar the water deepens to 8 and 11 fathoms and the navigation appears easy up to 7 miles from the entrance. The anchorage is said to be perfectly safe, but the radiation from Kamerun mountain causes the heat to be very oppressive. The magnificent amphitheater which forms the eastern side of mount Kamerun is crowned with numerous villages, the inhabitants of which mostly pursue the palm oil trade.

Bimbia river winds around the foot of Kamerun mountain, and then pursues a northerly course; it is connected with the Kamerun river by Matumal and Mordecai creeks.

Cape Kamerun.—From Bimbia river to cape Kamerun the distance is 14 miles in a southeasterly direction; the shore is convex toward the sea, low, and covered with mangroves, being visible in clear weather from a distance of about 12 miles.

Soundings.—Between Bimbia and Kamerun rivers the depths are from one to 2 fathoms less than shown on chart.

Kamerun river.—The entrance to this river is an estuary into which several streams discharge their waters. That branch which comes from NE. appears to be the most considerable, and has been named the Kamerun river. Two other rivers, Donga creek and the Kwakwa, enter the estuary from the eastward, and Malimba creek joins it immediately north of Suellaba point, the eastern entrance point.

The Kamerun river has been explored for a distance of 40 miles from the sea; at 12 miles above King Bell town and about 27 miles from the sea, the river divides into several branches; at 90 miles from the sea further navigation is said to be obstructed by rocks. The Kwakwa river has not been explored but is described as being of less magnitude than the Wuri or Dualla (the native name of the Kamerun river above King Bell town), and obstructed by rocks at about the same distance from the sea. The king of the Kwakwa country is said to reside 80 miles up the river, at a place named Longassi.

Matumal creek.—Immediately north of cape Kamerun the coast recedes and forms a deep bight 4 miles across at its entrance. At the head of this bight is the entrance to Matumal creek, which communicates with Bimbia river.

Green Patch point, lying NE. of cape Kamerun, distant 4½ miles, is a round point on the west side of the river covered with green bushes and sloping gently to the sea.

Mordecai creek.—Eastward of Green patch point is the entrance to Mordecai creek, which communicates with Bimbia river.

Rugged point, on which are some trees having a very irregular outline, is the eastern point of entrance to Mordecai creek; from it the coast, without any extensive indentations, trends in a northeasterly direction for 6 miles to Hickory point.

Old Hole point.—The bank fronting the shore off Old Hole point has extended. There is a depth of 3 feet only on its outer edge, at about ¾ mile S. 83° E. (S. 68° E. mag.) of the point. Rugged point kept to the northward of the bearing S. 81° W. (N. 84° W. mag.) leads southward of the bank.

Mungo creek enters the Kamerun just below Hickory town, and down which most of the ivory is brought for trade.

Suellaba point, the south entrance point of the Kamerun river is SE. of cape Kamerun, distant 3¾ miles; it is a singularly long, low, narrow point. It is reported that trees are growing within 300 yards of its extremity.

Malimba point is 8 miles NE. from Suellaba point; between these points the coast forms an extensive shoal bay which receives the waters of Kwakwa river and Malimba and Donga creeks. At the mouth of Malimba creek, immediately east of Suellaba point, are two small wooded islets.

From Malimba point the coast trends NE. for 6½ miles to King Bell town, the most extensive opening between them being known as Doctor creek, 4½ miles NE. of Malimba point.

Channel.—The navigable entrance to the Kamerun river, between cape Kamerun and Suellaba point, is narrowed to a width of about 1½ miles by extensive shoals, which extend from the shore on either side. Off cape Kamerun a depth of about 3 fathoms is found at a distance of 1½ miles from shore, the depth then suddenly increasing to 8 and 10 fathoms; great caution is therefore requisite on approaching this side of the channel, as the lead gives no warning.

The eastern side of the channel is deeper than the western, a depth of 10 fathoms being found at less than a mile north of Suellaba point.

Dogshead shoals.—The banks on the southern side of the entrance are named the Dogsheads; they almost always break heavily, and can be seen from a long distance.

The banks are very dangerous to vessels caught in the entrance by the ebb tide, which rushes with great velocity over them, especially at spring tides.

Dogshead banks are steep-to; on their NW. side, at less than ½ mile from them, will be found a depth of from 10 to 12 fathoms; care should therefore be taken not to approach them too closely, on account of the sudden decrease in the soundings.

Outer anchorage.—Should a vessel be obliged to anchor outside Kamerun river, she may ride easily in 6½ fathoms, with cape Kamerun bearing N. 35° E. (N. 50° E. mag.) out of the strength of the tide.

Beacons.—The following beacons are erected:

A pyramid beacon 50 feet high on cape Kamerun.

A pyramid beacon 50 feet high on the extreme of Suellaba point.

A beacon consisting of two white boards at right angles to one another, 330 yards westward of Green patch point.

A white pyramid beacon 380 yards westward of Manoka point.

A beacon of white boards with a rectangular top, facing SW. on the eastern extreme of Rugged point.

A white beacon on Doctor point.

Buoys.—Buoys have been laid down to mark the channel in the Kamerun river.

Entering the Kamerun river, red buoys should be left on the starboard hand; and the black buoys on the port hand.

Kamerun (entrance) buoy, painted red and white, and surmounted by two balls, lies with Cape Kamerun beacon bearing N. 22° E. (N. 37° E. mag.), distant 8¾ miles, and Suellaba point N. 43° E. (N. 58° E. mag.).

Caution.—The beacons and buoys in Kamerun river are not to be depended upon.

Greatest draft.—Strangers in vessels drawing above 16 feet should not go up the river without a pilot. On the 1st of August, 1888, there was only 9¾ feet of water on the bar, which will probably not continue for a long time.

Directions.—If the weather is not clear, it is advisable to ascertain the vessel's position by making the land near Debundga point, if from the westward, or near Ambas bay, if from the southward, before attempting to make Kamerun buoy.

For entering the Kamerun river, bring cape Kamerun to bear N. 22° E. (N. 37° E. mag.) before getting into less than 6½ fathoms of water, and steer for it on that bearing before Manoka point opens out clear of Suellaba point; and then alter course to N. 72° E. (N. 87° E. mag.), keep the red buoys on the starboard hand and anchor in 6 or 7 fathoms, when the intervening spaces between the four small islands in Malimba creek are equal, bearing about S. 26° E. (S. 11° E. mag.), it is well to keep near the Bimbia flats than the precipitous Dogshead.

If intending to proceed up the river, when Manoka point is open of Suellaba point, steer N. 58° E. (N. 73° E. mag.) toward Malimba point until within a short distance to the northward of the red buoy E, off that point and Mutangari point bears about N. 18° W. (N. 3° W. mag.); then steer more northerly for about 3 miles for the next red buoy F; after leaving this on the starboard hand, steer for the red buoy G, off Rugged point, which also leave on the starboard hand; from this buoy a course should be steered for the red buoy H, in line with Doctor point, passing close to the black buoy, which should be kept in line with H and then

with G. (See Old Hole point, page 268.) The chart will now be the best guide to as far as the bar, to cross which pass the red bar buoy off Joss point at about 60 yards on the starboard hand, then steer N. 58° E. (N. 73° E. mag.) for the Kwa mission house and bring the black bar buoy right astern; keep on the line between this buoy and the mission house until abreast of the Governor's house, when a course may be shaped for the hulks moored off Kwa town where good anchorage may be obtained in 4 or 5 fathoms, soft bottom. If wishing to go beyond the hulks and anchor higher up, pass close on their NW. side to avoid the Hickory sand. The channel off King Bell town is about 350 feet across.

The bottom in the channels of the river is very soft, and would not damage a vessel on grounding; on the bar it is hard sand and gravel. Mail steamers drawing 18 feet proceed as far as King Bell town. The best time for entering the river is about 2 hours before high water at King Bell town.

Signals.—The depth of water on the bar is shown on the flagstaff of government house at Kamerun by signals made according to the numerals in the International Signal Book; the numbers will give the depth in decimeters.

The signals are made to caution vessels which, on account of their draft, could not cross the bar to anchor.

Tides.—It is high water, full and change, in the Kamerun river at about 5h. 15m.; springs rise 7 feet, neaps 5 feet. The strength of the tidal stream at half tide is from 2 to 3 knots an hour, and must be allowed for in the navigation of the river. After a series of heavy rains the ebb runs from 7 to 8 hours, attaining a maximum velocity of $2\frac{7}{10}$ knots an hour. The flood runs 4 to 5 hours at a rate of 2 knots. In the rainy season the water mark is $1\frac{1}{2}$ feet higher than in the dry season.

Pilots.—In the event of a boat being sent up the river for a pilot, from the anchorage south of Green Patch point, directions should be given to keep along the northern shore for 6 or 7 miles, until east of the mouth of Mordecai creek, when, if there are any vessels lying off King Bell town, their masts will be seen. Native pilots can be obtained at Old Hole point.

King Bell town.—The towns of King Bell and King Akwa, separated only by a little brook, are apparently of great extent and considerable population. The houses are neatly built of bamboo, in wide and regular streets, with numerous plantain and cocoanut trees, and even large fields of maize.

The settlements are on a plain, which, being elevated about 50 feet above the river, and being of a sandy nature, may be considered as comparatively healthy, an inference corroborated by the appearance of the natives, and the accounts of trade agents long resident in the country. A considerable trade has been carried on for many years with the natives, who, from their activity

in collecting palm oil and their intercourse with Europeans, have become a large and important community, possessing a high degree of civilization.

Coal.—There is a coal store at Kamerun river; the supply is uncertain.

Water.—The water in the rivers is bad and stock is scarce and dear. Vessels should therefore be provided with both.

Communication.—Once a month by west coast steamers, and every three weeks by Hamburg steamers.

Tornadoes.—In October the tornadoes commence, being violent at first; they continue, when the harmattan is not blowing, until the month of May, occurring most frequently and being most violent between the middle of April and the middle of May; they come from NE. and east, and off the Old Kalaba river occasionally blow directly on shore from SE.

Harmattan.—During the season when this dry easterly wind may be expected (December to February), dense mists, locally known as smokes, prevail, which are so dense that nothing can be seen at more than 200 yards from the vessel, and mariners approaching the coast have no resource but to anchor. In March, April, and May the weather is clearer, and occasionally, especially after a tornado, very clear, when the high land of Fernando Po and Kamerun mountain may be seen from a distance of 100 miles; but even during these months a vessel may frequently approach within 7 or 8 miles of the land without seeing it. The nights at this season are very fine.

Occasionally the harmattan blows continuously for days together.

Temperature.—The average temperature during the year at Old Kalaba river is 80° to 90° F., the maximum being 90° F. and the minimum 72° F.; these extremes seldom occur.

Anchorage.—A vessel may anchor off this coast at all seasons of the year, but never in less than 7 fathoms except in case of necessity, because when in less than that depth the swell begins to assume the character of rollers and causes the vessel to ride very uneasily; indeed, 10 fathoms is a better depth in which to come to, so that the anchor may be weighed and stowed before making sail.

Palm oil season.—The palm oil season lasts from March to September, when it becomes scarcer, and is out of season, but in fact it may be and is obtained all the year round.

Commerce.—The natives on the banks of these rivers are exclusively devoted to the palm oil trade. To seek for that article they ascend the numerous creeks of the delta of the Niger for 40 or 50 miles in their large canoes. Provisions, poultry, meat, and food are scarce, but the rivers abound in fish. Yams, kids, and dry fish constitute the food of the population, who, finding the trade in palm oil more lucrative than that in provisions, sell but little of the latter and at high prices.

Vessels lie in the rivers at all seasons. They should be housed over with

palm thatch, and have their holds thoroughly cleaned, particularly about the bilge and well, and if possible there should be ventilation along the bottom under the cargo; stoves should occasionally be lighted, and the whole vessel kept as dry as possible.

A trading vessel frequently takes three or four months to complete a cargo of palm oil. A quantity of salt should be procured at Cape Verde islands on the passage from England; Krumen obtained on the Kru coast, and water and provisions purchased at Fernando Po.

During the rainy season the bars of some of the palm oil rivers are occasionally impassable, also at full and change of moon the crossing is worse than at other times.

The best time to enter is, as a rule, at half flood.

Current.—The general direction and strength of the current is easterly, at the rate of about one mile an hour thoughout the year, except during the harmattan season, when the direction is changed to WSW.; a heavy tornado will sometimes change the set of the current for a day or two, or occasionally when strong winds cause the water to accumulate at the head of the bight, the current will set for a few days to the westward; in October, off cape Formoso, the current has been known to set to NNW., at the rate of 34 miles per day for three days after a tornado. Vessels therefore bound to Bonny river, if overtaken by night, should either anchor or work to windward until the morning, for if once to leeward, especially during the rains, a dull sailing vessel will have great difficulty in getting again to windward.

Soundings.—A rough general rule for estimating the distance from the coast between cape Formoso and Old Kalaba river, is to allow one mile off shore for every fathom of water; thus when in 10 fathoms a vessel will generally be as many miles from the shore. It is almost unnecessary to add, that the lead should be constantly used when in the vicinity of the shore.

CHAPTER XII.

KAMERUN RIVER TO CAPE LOPEZ.—BIGHT OF BIAFRA.

The Kameruns.—The district under the German rule named The Kameruns is in the NE. part of the bight of Biafra, with a coast line extending from Rio del Rey creek to Campo river, and includes Kamerun river and Kamerun mountains. A provisional agreement was made in 1885 defining the line of demarcation between the German and British territories, and negotiations are still (February, 1892) in progress for final settlement. By an agreement made in 1885 between France and Germany, the boundry between The Kameruns and the French Kongo territory is the line running eastward from the mouth of Campo river to a point 15° East of Greenwich.

The area of The Kamerun is stated to be about 130,000 square miles.

The population is estimated to be 2,600,000.

Exports.—The chief exports are palm oil, dyewood, wax, and ivory.

French Kongo is included between Campo river in latitude 2° 20′ N. and Massabe in latitude 5° 2′ S.* On the north or right bank of the Kongo, French territory includes that part of the river bank between the meridian of 14° 40′ and 17° E. longitude.

From Gaboon river, which has become the center of administration, to Lomba river, the country is known as the Gaboon, and was colonized by the French in 1843. Here there is a naval and military establishment independent of the government at Senegal.

French Kongo is estimated to be about 220,000 square miles in extent.

Population.—The population number about 2,500,000. The children are well cared for; the boys are taught some useful trade and the girls are instructed in domestic duties of various kinds.

Products.—The chief product of the Gaboon country is ivory, which is brought from the interior in great quantities and said to be the finest on the west coast; it also produces barwood, from which is obtained a dark-red dye; and ebony, the latter being produced from the great forests of this valuable wood which abound near the head waters of the Gaboon. The barwood is found in great plenty along the shores of the river and its numerous creeks, as well as on the banks of the Muni and Munda rivers. Vegetation throughout is magnificent, and woods of all kinds, adapted for building and other purposes abound. The forests of the interior are hewn by Bulus of bushmen; the Mpongo, or inhabitants of the banks of the river,

*Nationality of Corisco bay, latitude 1° N., is still under consideration between the French and Spanish governments.

acting as brokers between the European traders and the Bulus, and striving to prevent direct intercourse, such as might interfere with their interests. The country and soil are well adapted for cotton and other tropical commodities not indigenous to the country; the coffee plant has already been introduced, and sugar cane grows luxuriantly on the banks of the river.

Kabenda.—The Portuguese territory of Kabenda, situated north of the Kongo, embraces the coast line from Massabe in latitude 5° 2′ S. to Red point in 5° 43′ S.

Population.—The Kabenda tribe is said to number about 10,000. The natives are docile, industrious, and intelligent; their ingenuity being evinced in the manufacture of clothes for their own use; also in the construction of commodious launches for carrying on commerce along the coast, which they do as far as Benguela, both on their own account and when chartered by merchants.

Trade.—The trade of Kabenda is in ivory, gum, wax, and honey; there is also a little orchilla and gum copal.

Kongo Free state.—The seacoast belonging to this state is about 20 miles in extent, and lies between Kabenda territory and Kongo river, the northern limit being Red point in latitude 5° 43′ S. The territory of Kongo Free state embraces the north or right bank of the Kongo as far as the meridian of longitude 14° 40′ E., and also eastward from the meridian of longitude 17° E. from Greenwich. On the left or south bank, the territory extends eastward from the Uango Uango (Wanga Wanga) river in about longitude 13° 49′ E.

The Kongo territory is intersected by numerous rivers, which have their rise in the extensive mountain ranges of the interior, to which the Portuguese have given the names of Do Sal, Do Sal Nitro, and Do Cristol. The state was founded by the king of the Belgians in 1884, and is about 827,000 square miles in extent.

Population.—There is estimated to be 15,000,000 inhabitants.

Products.—The soil of the Kongo territory is excessively fertile, and the vegetation luxuriant; tobacco and sugar cane are cultivated; fruits and vegetables, such as are to be found in intertropical climates, are procurable; and it is believed that the cereals of Europe might be introduced with advantage. The principal articles of legal commerce are ivory and palm oil; but the forests contain many species of valuable woods.

Angola.—The Portuguese territory begins on the south or left bank of the Kongo river at the Uango Uango (Wanga Wanga) river, in about longitude 13° 49′ E., and traverses westward to the mouth of the Kongo, whence it extends southward along the coast to the Cunene river in latitude, 17° 16′ S. which rivers, by a declaration signed on December 30, 1886, form the boundary between the Portuguese and German possessions. Angola contains about 603,000 square miles.

Population.—There are about 3,600,000 inhabitants.

Trade.—The principal articles of commerce are ivory, gum copal, orchilla, and beeswax, the latter being procured in great quantities in the interior.

Damaraland and Namaqualand, which are under the German protectorate, have a coast line extending from Cunene river on the north to as far as Orange river on the south, with the exception of Walfisch bay, which is British. The proctectorate contains about 342,000 square miles. Game is very abundant. The coast from Cape Negro, in latitude 15° 40′ 45″ S., to beyond Ichabo island, off Angra Pequena (Lüderitz bay), is a desert region of arid sands, and nearly rainless, though at times heavy dews prevail.

Population.—The population is estimated to be about 250,000. Between the locality of Great Fish bay and Cape Colony the coast is inhabited by various tribes, the principal being the Cimbebas, who inhabit the country of Cimbebasia between Great Fish bay and cape Cross, and the Hottentots, who occupy Hottentotia, thence to the southward as far as Orange river. The natives along this coast are very sparsely distributed, and, though generally harmless, are of little service to civilized man.

Walfisch bay.—This British territory is about 30 miles in extent north and south and 20 miles east and west. A German flagstaff and notice board stand near the northern bank of the Swakop river, and English beacons near the southern bank; the northern boundary line is midway between, in the bed of the river. The mouth of Swakop river is in latitude 22° 42′ S.

Population.—The natives in the territory chiefly reside at Sandfontein and Rooibank, 2½ miles and 22 miles, respectively, from the settlement, and number about 1,000.

Cape Colony is separated from the German possessions to the north by a line commencing at the mouth of Orange river, in latitude 28° 30′ S., and ascending the north bank of that river to the point where it is intersected by the 20th degree of East longitude. The whole territory southward, to the extremity of Africa, is included in Cape Colony, the coast line reaching in one continuous sweep from Orange river on the west coast to the colony of Natal on the east coast, a distance of 1,200 miles.

Cape Colony, which has an area of about 233,000 square miles, is divided geographically into two parts by the main range of mountains, which follow the line of seacoast, and the southern portion is again divided by two other ranges, which run east and west. Between the mountains and the sea, in the southwestern portion of the colony, are situated the chief grain and wine-producing districts; in the south there are extensive forests, and along the southeastern coast, where the climate is almost tropical, tobacco and maize are successfully cultivated. Between

the two upper ranges of mountains is an elevated tract known as Great Karroo, which extends from west to east for 300 miles, and has a breadth of 70 miles. It is a dry district, but after rain is covered with luxuriant vegetation, and supports numerous flocks of sheep, and many cattle and horses. It is here also that the important industry of ostrich farming is carried on. The country to the north, still more elevated, and forming part of the great south Africa table-land, also supports large numbers of sheep, and in addition contains the chief mineral districts.

Rivers.—The rivers of South Africa are numerous, but practically useless for either irrigation or navigation. Most of them flow in deep ravines, and, except when swollen by the rains, even the largest have either bars at their mouths, which renders entrance both difficult and dangerous, or are too shallow to admit vessels of any size.

The Population of Cape Colony was estimated at the end of 1888 at about 1,428,700, of whom 350,000 are of European descent. The dutch preponderate in the western and the English in the eastern districts.

Products.—The principal industries are the production of wool and wine, and the rearing of horses, cattle, sheep, and ostriches. Great attention is paid to the cultivation of wheat, barley, maize, and oats. The waters around the coast abound in fish. The colony is also rich in minerals; there are important copper mines, the ore being of the richest kind; gold is found, and so is manganese. Coal also is mined of a considerable value, the present annual produce being about 27,000 tons. But by far the most valuable export is that of diamonds, which are chiefly found at Kimberly; the first diamond discovered being in 1867.

Climate and Rainfall.—South side of the bight of Biafra.—April and May are the season of calms, and tornadoes are frequent and blow from the eastward. At the end of November storms are of frequent occurrence, and abundant rain falls sometimes for several days in succession. During December, January, and February (the fine weather season) the harmattan prevails, and though not continuous throughout this period, it occasionally blows for several days without intermission.

Generally it may be said that the seasons, as far south as the Gaboon river, are similar to those of the bight of Benin.

Gaboon river.—Although it has been assumed that in the Gaboon there are two dry and wet seasons, it would be difficult to assign a limit to either, for the weather is undoubtedly very variable, and rain is more or less abundant throughout the year. What, by comparison, is termed the dry season lasts from June to September, during which period the heat is intense, although the sun is generally obscured; and the place is rendered unhealthy by miasmatic exhalations from the ground.

The rains commence toward the end of September and continue until the end of January, the greatest fall occurring during the latter half of

this period; from February to May inclusive fine weather and rain alternate.

Thunderstorms, though of short duration, are very heavy and are accompanied by heavy rain. As a rule, if one month be bad the next is comparatively fine. January has the reputation of being the most unpleasant month in the year.

From the equator to 10° South the rains generally begin early in November, and continue until the middle of April. Southward of 10° there is occasionally no rain for several years in succession, but sometimes during the months of November and December it falls in excessive quantities, and parts of the country become almost inundated. For instance, no rain fell near Benguela during the years 1840, 1841, and 1842; but the appearance of immense water courses, in which were large trees that the torrents must have brought many miles from the interior amply testify to the occasional floods.

On the subject of the seasons, Captain Kerhallet, of the French Navy, observes: "One general remark to be made on the seasons of this portion of the coast is, that they are found to be more backward as an advance is made to the southward. Everytime the sun, in its alternate passage from one hemisphere to the other, passes the zenith of the place, this period is generally that of the bad season of rains, squalls, and storms in places near the equator, these passages occur every six months, and therefore during the year there are two rainy and two dry seasons; the former when the sun is in the zenith, and the latter when it is at its greatest distance from the equator north or south. This rule, however, is not to be considered absolute, for in parts near the equator, what may be called the dry season, is that in which the rains are less heavy or continuous than at other times, while the season subject to storms and tornadoes has its intervals of fine weather."

The quantity of rain which falls in the southern latitude bears no proportion to the wet seasons north of the equator; and this becomes apparent by the aspect of the coast, which southward of the Fernan Vaz river changes from the luxuriance of the shore north of the equator to the brown looking and often bare and arid downs, which then begin to characterize the scenery. About cape Lopez fair weather can not be expected before the middle of May.

On the coast north of Loango the rainy season commences in September, and continues throughout October, November, and part of December; this is followed by the hot weather, which extends to the end of February. Tornadoes and storms prevail throughout March, April, May, and the beginning of June, and are also experienced in September and October. From the latter part of June to the end of August is the dry season.

On the southern part of Loango and around the Kongo river, the rainy

reason (Massanga) usually begins in October, although sometimes it is setarded until November, or even December, and terminates in January, when the harvest months, of great heat (Neasu), succeed and continue until March or April. Then follows the tornado season (Quitombo) during May and June, and afterwards the dry season prevails until September. It is during this latter season that fogs of a dense character prevail.

The months of March and April are the most unhealthy, and this is owing to the exhalations from the earth after the heavy rains, which the light breezes from the sea are not sufficient to dispel. From May to September is the most pleasant and healthy part of the year; the sky during this period is generally overcast, and in the months of June, July, and August a thick fog, called the "smokes," prevails, which is not caused by exhalation, and is neither unwholesome nor unpleasant.

Tornadoes occur in September and October, as well as in May and June; they generally blow from the SE., but are not so violent as those northward of the equator. Altogether, the weather south of the equator is much pleasanter than to the northward. The breezes are always moderate, the water is smoother, and tornadoes, though generally accompanied by lightning, thunder, and very heavy rain, are not so violent; a quarter of an hour may be considered the average duration of the wind, but the rain lasts some time. After a tornado the winds are variable, and sometimes veer round the compass in twenty-four hours. In or about the parallel of the Kongo river these tornadoes cease.

Kongo river to Great Fish bay.—From May to November may be considered the fine season; during this period, particularly from the middle of June until early in October, beautiful bracing weather is experienced, though at times heavy dews fall, particularly in July.

June to September is the harvest season, when the rains have fallen in the ordinary time.

The hot season commences in November and lasts till the end of April. This may be considered the sickly and the rainy season; most rain falling during February and March, but south of St. Philips Bonnet, Benguela, frequently a season passes without any hazy weather like smokes in the bight of Benin.

Great Fish bay to Possession island.—The medium temperature of the air in the neighborhood of Angra Pequena is about 63°, and at Walfisch bay 66°; but the temperature was invariably 4° or 5° lower on the coast than out at sea. The barometer on this coast ranges from 29.9 to 30.2 inches.

In the summer season, when the weather is calm, and the sky without a cloud, the sun is very powerful; but generally speaking, and more especially during the prevalence of the southerly winds, from August to May, the temperature is moderate. These southerly winds are stronger in pro-

portion as the south latitude increases. Thick woollen clothing is then required, for the wind is at times keen. The temperature does not vary much, averaging during the year in the shade 50° or 60°.

On all this coast it seldom or never rains. The dews, however, during the nights are heavy, and thick fogs in the winter season saturate everything with moisture. After one of these fogs, water will frequently drip from the rigging of vessels by buckets full.

Possession island to cape St. Martin.—The seasons on this part of the coast are not well defined. In the months of May, June, July, and August, rain rarely falls; but during the remaining months of the year, rain is occasionally experienced, and sometimes extends over several days, especially between September and March.

Cape Colony.—The climate of Cape Colony is very favorable to people of European birth; the temperature at Cape Town, by tables compiled from careful observations during twenty years, made by Sir Thomas Maclear, the astronomer royal at the Cape observatory, is shown to be less variable than in most countries. The average temperature in winter is only about 15° below that in summer. The mean temperature throughout the year is 62°, the maximum being 97 °and the minimum 38°. The mean temperature at Cape Town is about 76° in February, and 59° in July. The summer may be said to commence in November and end in April.

The climate is healthy, which is doubtless attributable to the absence of great climatic fluctuations; and experience has proved that early symptoms of consumption have been entirely eradicated by residence in a country where, throughout the year, there are no violent changes from heat to cold.

The average rainfall at Cape Town is 23 inches. In 1886, from observations made, it rained on 90 days, with a fall amounting to 30.84 inches, at Kloof street in Cape Town, which is 450 feet above the sea; while at Green point, which is 20 feet above the sea and two miles to the northward, rain fell only on 61 days, and the number of inches 16.86.

The coast.—From Suellaba point on the south side of the entrance of the Kamerun river, the coast takes a general trend of SSE. for a distance of 54 miles, as far as the bottom of Panavia bight, about the third degree of North latitude, and thence about S. by W. as far as the second parallel of latitude. Here the land falls back into a deep indentation known as Bata bay, whence its general direction is SW. by S. as far as cape St. John, a distance of 54 miles.

Southward of this cape lies the extensive bight known as Corisco bay, which is separated from the Gaboon river by the peninsula or rather island of Esterias, for it is believed that one of the creeks southward of the bay communicates with the inner basin of the Gaboon estuary.

The shore line between the Kamerun and Gaboon rivers is uniformly low and wooded, and generally fringed by a sandy beach, off which, in many places lie detached rocky patches. The large trees with which the coast is thickly covered may be seen from seaward a distance of 12 to 15 miles, and from the irregularity of their outline, often assume the appearance of an undulating hilly country.

Beyond what may be termed the sea shore plain, principally in the northern part of the coast, there are, in the interior, mountains of a conical form apparently isolated, as well as ranges more or less extended, with diversified shades according to their distance from the coast. They offer excellent points for recognition, as several of them are very lofty, thus among others, the Mitre, eastward of cape St. John, attains an elevation of 3,940 feet, while the central Sharp peak of the extensive range, known as the Seven hills, rises 2,786 feet above the sea level.

Between the second and third degress of North latitude, the ground, as it recedes from the coast, rises to a series of elevated plateaus, the more distant showing the highest peaks, as those of the Table and Saddle, which assume the appearance of being isolated when seen from a distance; but in Corisco bay the land as far as the Gaboon river is less remarkable. The navigation along this extensive tract of coast may be considered safe by keeping a moderate offing, except in the vicinity of cape St. John, where the depths are very irregular, and render increased caution necessary.

Malimba river.—This river, formerly known as the Borea, has two mouths, about 4 miles apart; the Borno, or northern mouth, is situated about 15 miles southward of Suellaba point. The Borea, or southern mouth, is the principal outlet for the trade of the district. There are factories at Borea village on the north side of entrance and at Malimba on the south side. The town of Edea is about 40 miles up the river; small steamers may ascend that distance at high water, though probably not without grounding, as there are several shallows in the river for 15 miles above the mouth, whence the depths to the town are 3 or 4 fathoms.

Borno mouth is said to be barred by a sand bank, with 6 feet water only, and to be generally practicable for boats. The bar at its mouth appears to have a depth of from 7 to 9 feet at low water at one mile off, with about 2 fathoms at 2 miles off shore; the rise of tide is about 5 feet. There is anchorage in 2 fathoms about 150 yards from shore, off the westernmost building of Woerman factory at Malimba, well sheltered by the southern point of entrance; the holding ground is bad.

Borea mouth.—There are two channels to this mouth which are liable to frequent changes. In 1889 the northern channel was open for navigation; in 1890 it had silted up and the southern channel was open. The *Natchtigal* passed over the bar one hour before high water springs, carry-

ing 10½ feet water, and anchored in 16½ feet at about 400 yards from the south shore NW. of Woerman factory. At times there is too much sea on to cross the bar.

Currents.—During floods caused by the rains the stream always runs out; with the water falling it runs about 4 knots an hour, being reduced by the rising tide to about 3 knots.

Panavia bight.—From the Malimba river to Garajam point, the southern limit of Panavia bight, the distance is 40 miles in a SSE. direction; the bay is clear of any known dangers, and the soundings vary from 5 to 7 fathoms, mud and sand, at the distance of 3 miles from the land.

Beundo river.—The main entrance to the river, just within which is Little Batonga, is about 27 miles southward of Malimba; but the channel is subject to much change.

Directions.—The beacon erected on the shore near Little Batonga kept N. 4° W. (N. 11° E. mag.) led over the bar in about 10 feet at high water (1886); when a small islet opened off the south point, the course thence was in mid-river until abreast the south bank, where there was anchorage in about 20 feet at 100 yards from the shore. The *Natchtigal* proceeded up as far as the falls, about 30 miles, but touched the ground in several places. It is not advisable to attempt crossing the bar without sounding it, or obtaining assistance from the factories.

There is apparently an entrance within the island fronting Little Batonga, but there is no information concerning it.

Water.—Between the river alluded to above and Garajam point is the deepest part of the bight, and at the distance of 6½ miles NE. of Garajam point is a small river with a cascade, which discharges itself into the bay and furnishes excellent water.

Rock.—In front of Lubecke factory there is a rock at 1,000 yards off shore which is visible at low water. Two beacons have been erected north of the factory, they are poles with a white cross, and stand N. 60° W. (N. 45° W. mag.) and S. 60° E. (S. 45° E. mag.) of each other. South of them, when in line, there are several other rocks, but north of their line of bearing it is clear. Vessels anchoring in not over 4½ fathoms are outside the rocks, which are dangerous to boats or steam launches.

Anchorage may be obtained anywhere along the shores of Panavia bight in from 5 to 6 fathoms, mud, but the anchorage abreast of the river is generally preferred, on account of the facilities for obtaining water. Along the shores of Panavia bight there are three known villages, which are distant from Borea point 7, 17, and 22 miles respectively. The anchorages along this coast are secure, as the tornados blow off shore.

Garajam point, the southern limit of Panavia bight is low and wooded, and having a rounded form is somewhat difficult to recognize from a distance. Abreast of the point, at the distance of a mile off shore, are two

clusters of rocks, both of which break, but one only appears above water; while on the beach are other rocks which show out distinctly against the white sand of which the beach is composed.

From Garajam point the coast trends S. by W. for 40 miles to Campo point. Inland there are many remarkable hills, one of which, Elephant mountain, lies 12 miles south of Garajam point.

For a distance of 23 miles southward of Garajam point the coast has a fine beach without mangroves, but rocks extend off in many places to the distance of ½ mile from the shore; it is desirable therefore to keep a good offing of about 2 miles, or in from 12 to 14 fathoms water.

Lowry river waterfall.—In latitude 2° 56′ N., and about 3 miles southward of Garajam point, the Lowry river flows into the sea over a cliff 20 or 30 feet high. The fall is at the bottom of a small bay, and is hidden by the formation of the land, from vessels approaching from the south, until it bears about S. 83° E. (S. 68° E. mag.) . In the dry season it is probable that the fall is not discernible any distance. It should be a good watering place for the beach is quite smooth and the anchorage off it is excellent.

Kribi, where there is a large German tobacco plantation, is at the mouth of Lowry river.

Batonga roadstead is abreast an English factory about 7 miles southward of Garajam point. There are 5 fathoms about 1½ miles off shore, but the landing is dangerous and many lives have been lost in making the attempt; at times a heavy surf breaks upon the whole line of coast between Kamerun river and Corisco bay. Batonga is not easily recognized from the sea, as the factories do not show beyond a distance of 4 or 5 miles, but Elephant mount kept on a S. 60° E. (S. 45° E. mag.) bearing will lead to it; the best anchorage is in 6 fathoms, with the waterfall in line with the tail of Elephant mount bearing S. 60° E. (S. 45° E. mag.).

Waterfall.—Just north of the factory is the cascade or waterfall of Eloke or Batonga river, which assists in identifying Batonga, but in the dry season it is insignificant.

Country.—The country known by the names of Batonga or Banoko—properly the names of important tribes—begins at the south shore of the innermost recess of the bight of Biafra, and extends southward as far as cape St. John, the limit in this direction of the British consulate of Biafra.

The aspect of the coast is by no means unpleasant; it consists of a long band of densely wooded lowland, based upon a yellow line of sand, broken in places, which appear to be the mouths of small rivers. Here and there fields of a lighter green give evidence of plantations, and the clusters of brown huts prove it to be not deficient in population.

Inhabitants.—The inhabitants of the coast, or trading people, call themselves Batonga men, in contradistinction to the Bushmen, or savage people of the interior, who have penetrated to the coast at a few points,

and are said to be treacherous and hostile. The articles of export from this coast are dyewoods, wax and ivory. The headquarters of this trade have hitherto been at the Gaboon river.

Batonga is celebrated for its canoes, which are made of cottonwood or some other light timber, carefully hollowed out by native adzes. They are about the length of a man, rarely exceed 15 pounds in weight, are sometimes carved and decorated with red paint, and yet sell for a dollar each. The man who maneuvers the canoe sits on a curved-shaped bridge of wood, a few inches above the gunwale, as on a saddle, with one leg on each side and his feet in the water. Nothing can exceed the skill with which these people launch through a heavy surf which would prove fatal to ordinary ship's boats.

The canoe is as buoyant as a water bird, and the perfect manner in which the natives balance themselves without capsizing is truly surprising; but even if the boat does turn over, it is easily righted by men who are almost amphibious. At a distance the fisherman appears to be sitting on the waves, and when there are rollers, nothing but his head protrudes above the surface. If beckoned on board a ship, he climbs up the side with canoe and paddle under his arm, for fear of theft. These canoes are only found on the coast between Panavia bight and Campo point. The Krumen, who are excellent canoe men in their way, can make nothing of these tiny boats, being unable to maneuver them.

Elephant mount rises to on elevation of 1,707 feet about 10 miles ESE. of Batonga roadstead, whence it is clearly discernible; curious to say, there is a similar formation on the East African coast in almost the same latitude. From a distance the resemblance to an elephant *couchant* is striking. When the clouds clear away a long crest extends high above the low lands; sundry depressions form the ear and neck, a swelling on the right of the profile dipping toward the southern base is the trunk, and the body everywhere bristles with trees. It is an excellent mark for making the Banoko and Batonga anchorages.

Mount Nisus.—At the distance of about 8 miles ENE. from Elephant mount is a high, isolated, conical hill, known as mount Nisus, which, though belonging to a more distant range than Elephant mount, is easily identified from seaward.

Les Mamelles.—The range of which Elephant mount forms the northern part follows the line of coast in about a SW. by W. direction for 17 miles, preserving a distance of about 7 miles from the shore. Les Mamelles are two hills of equal elevation in the above range, about 8 and 10 miles distant from Elephant mount, and derive their name from their peculiar formation.

Mount Alouette, 3,415 feet high, may be termed the southern shoulder of the above range. When seen from a distance of 18 miles to seaward,

it appears to rise with a gentle incline to its summit, whence, after making a decided undulation to the southward, it falls with a steep descent to the lower lands, which extend as far as the Campo river.

Saddle hill.—The second range back of the coast has nothing markedly prominent, a few crests rising here and there. In the third range are some hills or mounts remarkable in formation. To the northward an undulated summit terminated by small hills has been named the Saddle. To the southward a flat summit is called the Table; it is but little to northward of the parallel of the Campo river, and serves as a mark in approaching that part of the coast.

Banoko bay.—Banoko point, in latitude 2° 51′ 30″ N., forming the north point of the bay, is low and well wooded, with a small bight on its north and south sides, causing the points to project about ½ mile from the adjoining coast line.

The bay is 5½ miles across and 1¼ miles in depth, with a sandy beach, bounded on its north and south points by rocks, on which the sea breaks heavily. On the banks of a small stream just northward of Banoko point are several villages, but they are not seen from seaward. There is always a surf in the bay, where landing should never be attempted in a ship's boat.

This bay is easily recognized by Elephant mount, which is situated in the same parallel as the depth of the bay. The shores of the bay are low and wooded, but in the center of the bight is a thick clump of large trees, which from a distance makes like a dark hillock.

Tides.—It is high water, full and change, in Banoko bay, at 5h. 24m., the rise being 5 feet. At a distance of 3 miles off shore, the stream of tide was scarcely felt, although the high water mark was distinctly seen on the sandy beach.

Londotonga village and Bushtown.—Six miles southward of Batonga is the native village of Londotonga close to the sea; and about 4 miles further south is Bushtown, also a native village close to the coast.

Rocky pyramid.—On the beach, in latitude 2° 37′ N (approx.)., is a small, but remarkable pyramid of rock; after passing to the southward of which, a vessel should keep a greater offing, as the soundings are not so regular, and often suddenly decrease to 4 fathoms.

Campo bay.—From the north point of this bay (named Saddle point, in consequence of its being in the same parallel as Saddle hill) to Campo point the distance is about 9½ miles SSW., and from this line the bay falls back 3 miles in the vicinity of the Campo river. Saddle point is low, sandy, and covered with trees, and does not possess any remarkable characteristic, but Campo point, though low, and wooded, with a sandy beach, forms a salient feature of the coast, and is surrounded by a line of breakers ⅔ mile off shore.

Campo river flows into the sea, in the depth of Campo bay, about 3½ miles eastward of Campo point, and may be recognized not only by the

position of the point, but also by Saddle and Table hills. The mouth of the river is a mile broad, and, though a bar exists, the river is accessible to vessels of moderate draft; from the entrance, the river extends in a southeasterly direction for a distance of 12 miles, where it becomes bifurcated, but the exact course of this river has not yet been ascertained. There is a large village on the left bank of this river.

Factories.—A factory, flying the French flag, is situated on the south point of entrance to Campo river; English and German factories are situated on the north side of the entrance.

Anchorage.—The French vessel of war *Dumont d' Urville* anchored in 4½ fathoms with Campo point bearing S. 1° W. (S. 17° W. mag.) and south point of the river S. 81° E. (S. 65° E. mag.).

Caution.—Off the south point of the river is a rocky reef that appears at low water, and on which the sea breaks heavily. Off the river the soundings are said to be much shallower than those marked on the chart, so that caution must be used in approaching.

Trade.—The principal article of trade from this river is ivory, which is said to be of great commercial value.

Bata, or Fish, point.—From Campo point the coast trends southerly for a distance of 13 miles to Bata point, a low, wooded, and rounded point, difficult of recognition, with a fringe reef extending 1½ miles off shore, beyond which the water suddenly deepens. A little to the southward of Campo point the coast plateau terminates, but about 18 miles in the interior from Bata point, and a little southward of its parallel, are two small conical hills, about 4 miles apart, which adjoin the northern part of the chain known as the Seven hills.

There is a small river one mile south of Bata point up which the boats of H. M. S. *Growler* proceeded 12 miles, in 1869.

Bird rocks.—Between Campo and Bata points, and about 3 miles from the shore, is a group of three small islets or rocks, the central and largest being about 18 feet above the sea. From some positions, the largest rock, which is whitened, at times by the guano of birds, assumes the appearance of a sail, and this illusion is increased by the two rocks north and south much being lower and of a darker color than the central islet, and thus causing a resemblance to the hull of a vessel. The sea breaks heavily against these rocks, which lie in the 9-fathom line of soundings, but it is not known whether a passage exists between them and the main shore.

NOTE.—The rocks are said to be of one color, black, and to be of nearly equal height; the absence of birds at certain seasons might account for this.

Bata bay.—This bay lies between Bata point on the north, and cape Two Points, a distance of 27½ miles; the greatest depth of the bay from this line of direction being 7½ miles. Cape Two Points, low and wooded, with a sandy base, is surrounded by a sunken rocky reef, extending 1½ miles

off shore; the whole reef breaks, but especially its northern end. The shores of the bay are low and wooded, with a narrow sandy beach, and are free from any known dangers; the coast from Bata point trends SSE. for 12 miles, to the depth of the bay, which may be known by mount Bata, a remarkable conical hill, about 7 miles inland to the SE., in about latitude 1° 53′ N.

Light.—Bata light is a fixed white light, showing with greatest intensity when bearing S. 25° E. (S. 9° E. mag.), or over the anchorage. It is elevated 26 feet above the sea, and should be visible, in clear weather, from a distance of about 8 miles.

Anchorage.—There are three factories in Bata bay and one southward of Otondo river, and there is good anchorage in 6½ fathoms sand and stones with Bata mount between the two groups of factories bearing S. 75° E. (S. 59° E. mag.), and the extreme of the land to the southward S. 32° W. (S. 48° W. mag.). A heavy swell rolls into the bay, more especially during the afternoon and evening.

Landing is easily affected on the beach in front of the boat house of Woerman factory, the northeastern of the three.

Caution.—The soundings along the shore of the bay being very irregular, renders great caution necessary; the general nature of the bottom is mud, but in many places, especially to the southward, which is not frequented in consequence, there are patches of rocky bottom, and therefore it is necessary to ascertain the nature of the ground before anchoring.

The funnel and paddle wheels of the sunken steamer *Albatross* still show above water; the wreck lies about 400 yards from the usual anchorage.

Otondo, or Akoko, river.—There are six rivers flowing into Bata bay, and of these the third from the northward is named Otondo, on the north bank of which is the trading village of the same name, consisting of a few houses scattered along the shore. Off this river there is good anchorage in from 6 to 4 fathoms, and fresh water is obtainable.

Seven hills.—Southeastward of Bata bay is the mountain range known as the Seven hills, which lie 15 miles inland, and extend about NE. and SW. for a distance of 27 miles. This chain of hills is very remarkable from seaward, and from a distance presents seven distinct elevations, which culminate in a central sharp peak 2,786 feet high.

San Bento river.—The entrance of this river noted for its trade in ivory, is between Heybern and Joho points, and is about 1,200 yards broad. Heybern point may be known by Heybern hill standing close over it, of conical shape and moderate elevation, with a large village at the foot. From Joho point a sandy spit extends 1½ miles NW. by W., which has on its outer extreme from 2 to 6 feet water; between this extreme and the northern shore are several shoal heads of 5 feet, almost barring the

approach to the entrance, but by keeping Outer point in line with Green point (both points are on the north side of the river), S. 59° E. (S. 43° E. mag.), a vessel will carry not less than 11¼ feet, with the exception of one 6-foot shoal, to avoid which open Green point a little of Outer point until past it, then bring the points in line again and keep them so until right up to the mouth of the river, where the depth is from 3 to 4 fathoms, which depth is preserved for a distance of 3 or 4 miles further up. Anchor when abreast of the German factory at Joho point, about 200 or 300 yards from the shore, with the factory bearing N. 75° W. (N. 59° W. mag.). There is good anchorage about 3 miles off the river's mouth in 7 fathoms.

Entrance.—There is an American mission on the north side of entrance, and a German factory near Joho point, and a French mission stationat 1½ miles southward of it.

The river is navigable for about 12 miles, or to within a mile of the Yubi falls, which are three in number, having a total fall of about 40 feet. The river receives two affluents, the Ombé and Utonge, below Yubi falls. The Ombé is only accessible to boats, while the Utonge has depths of from 9 to 13 feet.

Tides.—It is high water, full and change at the entrance of the San Bento river, at 4h. 30m., the rise being 4½ feet at springs and 2½ at neaps. The ebb, at times, runs at the rate of more than 3 knots an hour, which, meeting the swell in the offing, causes the entrance to the river to appear as if barred with breakers.

The Mitre, is a remarkable mountain, with two summits, 3,940 feet high; it bears S. 50° E. (S. 34° E. mag.) from the entrance of San Bento river, while from the same point, Sharp peak bears N. 71° E. (N. 87° E. mag.).

The coast.—From the San Bento river, the coast takes a general trend of SW. by S. as far as cape St. John, a distance of 30 miles, and for the whole length, the land is low, undulating, and wooded. Along the shore, which is intersected by three rivers, is a narrow sandy beach, which is fringed in many places by rocky shoals, some of which uncover; while inland, the land rises to a moderate elevation.

For 15 miles from the San Bento river, the land trends SW., as far as a salient point at the entrance of the second of the three rivers just alluded to, and thence falls back into an indentation 8 miles across.

The first of the three rivers from northward, lies 6 miles from the San Bento river, and off its mouth are reefs and rocks above water, which seem to render access impracticable.

The mouth of the second river is at a point about midway between the San Bento, and cape St. John; off the north point of the river, breakers extend a mile off shore.

The entrance of the third river is 8 miles from cape St. John, in the depth of the bight already alluded to, whose shores are fringed by offlying reefs.

There is a village on the north bank of the entrance to each of these rivers.

Soundings.—From the San Bento river, along the coast to the southward, will be found depths of 5 and 6 fathoms, about 1½ miles off shore as far as the second river, but thence, as far as cape St. John, the same depths extends 3½ miles off shore.

Bokwa village.—At the distance of 9 miles southward of San Bento river, in latitude 1° 27′ N., is the trading village of Bokwa, near to, but not seen from the sea, as indeed is the case with most villages along this coast.

Mitre bank.—Nearly 10 miles off shore abreast the river south of Bokwa village, and about 15 miles N. 5° W. (N. 11° E. mag.) of cape St. John, is a bank about 3 miles in extent, on which there are depths of 16 and 17 fathoms, with 38 fathoms close-to all round; from this bank Mitre peak bears S. 83° E. (S. 67° E. mag.).

Būenja islet lies close to the shore, about 3½ miles NE. of cape St. John; it is small in extent, moderately high, generally shows green, and is surrounded by rocks on which the sea breaks heavily. A shallow bank extends from the islet for a distance of 2 miles in a northwesterly direction, and on its outer extremity in 11 feet water H. M. S. *Espoir* touched in 1865. This spot lies N. 2° W. (N. 14° E. mag.), 4 miles from cape St. John, and vessels navigating in the vicinity should be careful to preserve an offing of 3 or 4 miles, and keep the lead going.

Mumunein rock lies upward of 1½ miles off shore between the villages Itemboué and Bilogoué, and is about one mile long in a north and south direction, with depths of 4 to 16 feet over it. From the shoalest spot the western extreme of cape St. John bears S. 19° W. (S. 35° W. mag.), distant 5 miles. There is a passage with depths of not less than 2 fathoms between this rock and the shore.

The wreck of the German steamer *Tam*, which vessel struck on Mumunein rock in 1887, lies about 100 yards off shore, ¾ mile northward of Būenja islet, the masts and funnel with part of the hull showing above water, may be seen from a distance of 4 to 5 miles.

Rock.—A rock with 7 feet least water is reported to lie with cape St. John bearing S. 44° E. (S. 28° E. mag.), distant about 4 miles. This is probably the rock on which the *Diligent* struck in 1842.

Cape St John.—This headland is covered with trees, and from northward appears with three distinct heads, rather high, and easy of recognition. A white house, 2 miles northward of the cape, forms a good landmark. Against the base of the cape, which is rocky and without a beach, the sea breaks heavily.

In addition to a fringe of breakers which surround the cape ½ mile off, there is a continuous bank of rocky formation, with 6 and 7 fathoms

water, extending out to a distance of 3½ miles W. by N. of the cape, and thence falls suddenly to 20 and 23 fathoms; within this distance in various directions rocky bottom will be found.

Caution.—The shores adjoining the cape are very low, but often when approaching from the westward, the large trees have the appearance of hillocks, while the trunks assume a grayish tint, and become elongated; this distortion, which is occasioned by strong mirage, assumes the appearance of cliffs, intersected by broad fissures or ravines, where the trunks are hidden by foliage. This illusion is of frequent occurrence on this part of the coast, but is dispelled on closing with the land.

As there is reason to suppose that less water exists along the whole line of coast between the Kamerun river and Corisco bay than is shown on the charts, it is necessary to navigate with caution, especially so in the vicinity of cape St. John, where it is quite possible unknown rocky heads may exist.

Currents.—The currents near cape St. John run with great velocity, and are greatly augmented by the irregularities of the bottom; the stream from the SW. strikes violently against the cape and is there divided, one part running to the northward and the other penetrating Corisco bay. It is, therefore, quite necessary to be on guard against the currents when in the neighborhood of cape St. John or Corisco bay.

Corisco bay.—From cape St. John the coast trends SE. by S. 4½ miles to Northwest point, forming two shallow sandy bights, divided by a rocky point, and thence 1½ miles to Mosquito point—on which are detached masses of trees—with an intervening sandy bay; thence the shore sweeps back and forms a semicircle 12 miles across to Elobey point, and into this part of the bay the Muni river flows into the sea. Off the rocky points separating the sandy bays between cape St. John and Mosquito point, shoal water runs out from ½ mile to a mile, and between Northwest and Mosquito points is a village on the sandy beach.

From cape St. John to cape Esterias, the southern extremity of Corisco bay, the distance is 32 miles south; this line touches the eastern end of Corisco island, and eastward of it, the bight 14 miles in depth, is known as Corisco bay. The name Corisco is derived from the Portuguese, and was doubtless conferred in consequence of the frequent thunderstorms which visit this locality. This bay would be one of the finest harbors on the coast of Africa were it not for the multitude of islets, rocks, and banks, which cause its navigation to be attended with considerable difficulty. The natives of the Gaboon are the best pilots for the inner waters, of which there are no trustworthy charts.

From the Muni river, the coast of the bay takes a southerly trend for a distance of 20 miles to the entrance of the Munda river; the whole extent

of this wooded shore being fringed by shoal ground, extending in some places 3 miles from the land.

Seagull rock.—At the distance of 1¼ miles S. 77° W. (N. 87° W. mag.) of Northwest point, is a small detached rock which dries at low water, with 5 fathoms just outside of it; from the rock cape St. John bears N. 16 °W. (north mag.), and Musquito point S. 81° E. (S. 65° E. mag.). The bottom is very foul between the rock and point; at ⅓ mile inside of Seagull rock, there is another rock that dries at low water. Vessels therefore should not attempt to pass inside of Seagull rock. It was on this danger that the steamer *Macgregor Laird* was wrecked in November, 1871.

Directions.—Seagull rock lies much in the way of vessel coming from the northward and intending to pass north of Elobey isles, but by not bringing cape St. John westward of north (N. 16° E. mag.) until Mosquito point bears N. 88° E. (S. 76° E. mag.), a vessel will pass one mile westward of it.

Corisco island, which is moderately high and thickly wooded, occupies a central position between cape St. John and cape Esterias; it is 3 miles in length from north to south, with an average breadth of 1¾ miles; its NW. point is in latitude 0° 56′ N., longitde 9° 20′ 30″ E. The island is completely surrounded by a shallow bank, irregular in outline, but extending in some places 2½ miles off shore, and in addition to this extensive plateau are several detached rocky patches off the NE. shore of the island. The west point of the island is rocky and without vegetation, and the trees on the southern shore are thinly scattered as compared with the other shores. Between the south and SE. points of the island is a bay of moderate depth, near which is a bight of deep water in which anchorage may be obtained; the northern boundary of this bight is formed by a reef, which runs off for a distance of 2 miles in an easterly direction from the SE. point of the island. Parts of this reef are uncovered at low water.

Its western shore is rocky, and its rocks, especially on the south side, are covered with white spots, which can be seen afar off; the trunks of the trees appear distorted by refraction, as at cape St. John, and from a distance assume the appearance of grayish cliffs.

Resources.—The island is very productive, and is remarkable for the luxuriance of its diversified scenery, consisting of hills, forests, prairies, lakes, etc., all of which are necessarily on a diminutive scale. It grows magnificent woods, and the natives trade in ebony, dyewoods, and the ivory that they obtain from the Bushmen of the interior.

Supplies.—Water is said to be scarce in some parts of the island at certain seasons, though an abundant supply can always be obtained on the east side. The soil produces cocoanuts, manioc, plantains, sweet potatoes, yams, groundnuts, and limes. Fowls and fish are easily procured.

Population.—The population, numbering about 1,000, is scattered all over the island, the principal village being on the southern shore, opposite

Laval island. They belong to the Mhenga tribe, and are enterprising traders and daring boatmen. Formerly they were quarrelsome and ferocious, but, under the influence of missionaries who have settled among them, are now friendly and hospitable to strangers. The villages in the vicinity of cape St. John are subject to the authority of the chief of Corisco island. The other villages along the shores of the bay are inhabited by a savage race of Bushmen.

Corisco banks consists of two large and several small detached patches off the NE. point of Corisco island, the outer patch, with 3½ fathoms, being upward of 3 miles off shore. On the outer large patch are several spots with 12 feet, and on the inner and largest patch there is as little as 3 feet in some places. These shoals do not break, and are separated by comparatively deep-water channels, but the passages inside or between these dangers should never be attempted. The north and west shores of Corisco island should not be approached within 2½ miles, or in less than 7 fathoms, and on the NE. side an offing of 4 miles, or 13 fathoms water, should be preserved, in order to pass outside Corisco banks. On no account should any of the passages to the southward of the island be attempted by strangers.

Laval island is about one mile SSE. from the SW. point of the Corisco island. It is quite small, about 200 yards in length, moderately high, well wooded, and surrounded by breakers, especially on the north and east side. Off this latter side they extend ½ mile. The passage separating it from Corisco island is only available for canoes. The edge of the bank surrounding Corisco island passes 1½ miles to the westward and 2 miles southward of Laval island. About one mile SE. from the latter island is a reef on which, even in ordinary weather, the sea breaks heavily. At 2 long miles S. 79° W. (N. 85° W. mag.) of Laval island is an isolated crest with 2¾ fathoms, surrounded by 4 and 5 fathoms.

Laval bank.—This dangerous bank, which lies SSW. 3⅓ miles from Laval island, presents on its western side a long line of breakers and sunken rocks. It is 2 miles from north to south and 1½ miles in width, the outline being quite irregular, and lies about midway between the south side of Corisco and the west side of Bañe bank, with a narrow passage on either side that should be carefully avoided.

Bañe island, about ¼ mile in length, is low and covered with trees; it lies upward of 5 miles SSE. of the SE. end of Corisco island, and is surrounded by dangers on every side. The island rises from a shoal, half rock and half sand, many parts of which to the eastward of the island are dry. A large rock which never covers, lies a long mile S. 58° W. (S. 74° W. mag.) of the island.

Bañe bank.—This bank is 9 miles long in an ENE. and WSW. direction, with an average breadth of 3½ miles, and on it the depths are very

shallow and variable. The eastern part of the bank is marked by Crown sand, which dries at the distance of 2 miles S. 81° E. (S. 65° E. mag.), of Bañe island; and by East sand on the extreme eastern extension, which also dries and lies N. 74° E. (east mag.), distant 3 miles from Bañe island. Although the distance between Crown sand and the southern shore of Corisco bay amounts to 9 miles, the only available passage is along the southeastern side of Bañe bank, and near the Crown sand it is narrowed to 1¼ miles; and as no leading marks can be obtained, strangers should not attempt to enter the bay by this channel. As any written description would fail to convey an idea of all the intricacies of the extensive dangers in Corisco bay, the mariner is referred to the plan of the bay, which must be used with caution, for the relative positions and delineation of the various shoals.

Elobey isles.—Nearly 11 miles northeastward of Corisco island, and off the mouth of the Muni river, are the two Elobey isles, with numerous small islets, rocks, and banks in the immediate neighborhood. The islands are based on an extensive shoal, surrounding the group, and connected with the mainland, at the southern point of the entrance to the Muni river, which is 3⅓ miles distant from the inner, and smaller of the two islands—while in a seaward direction this bank, with from one to 3 fathoms water, extends 4½ miles in a northwesterly direction. The large island is uninhabited. It is not advisable to attempt reaching the anchorage to the NE. of Little Elobey isle without a pilot, whose aid can be procured by making the usual signal.

Factories.—On Little Elobey isle four factories are established, and there is an English factory on the south entrance point of Muni river. There are also trading stations established on the Munda river.

Tides.—It is high water, full and change, at Elobey isles, at 5h.; springs rise 7 feet.

Anchorage.—Between Corisco and Elobey islands, at a moderate distance from either shore, the bay forms one great anchorage, with depths varying from 9 to 12 fathoms, into which (by a reference to the chart) it will be seen that, with common precaution, there is no difficulty in entering; but trading vessels proceeding to the Muni river should have a pilot.

Good anchorage will be found in about 5 fathoms, with the NE. end of Corisco island bearing N. 67° W. (N. 51° W. mag.) and its SE. end S. 46° W. (S 62° W. mag.); in this position a vessel will be well sheltered from the SW., and the holding ground is so tenacious that the tornadoes from the eastward need not to be feared.

Though the water is usually quite smooth at this anchorage without any surf on the beach, it occasionally happens that a swell sets in without any apparent cause, when the rollers break on every shore of Corisco island.

The wind during the day generally prevails from the westward, gather-

ing strength toward noon; sometimes it continues with variable force through the night. Squalls, with much rain, thunder, and lightning, are here experienced both on and off shore.

Elobey point is 4 miles SW. of the south entrance point of Muni river. A French customhouse was established on the point in 1883. The village near it may be seen from the offing.

Muni river.—This river, which flows into the sea at the NE. angle of Corisco bay, is a mile broad between the low wooded points of its entrance, which lies 11 miles in a southeasterly direction from Mosquito point. The river is accessible for some miles from its mouth, within which it becomes enlarged, but the channel being encumbered with banks and rocks, renders navigation difficult, and the services of a pilot necessary. On the right bank of the river, 8 miles from the entrance, is a large village to which the Portuguese gave the name of Angra.

The accounts respecting the natives inhabiting the shores of Corisco bay are somewhat contradic ory, some representing them as being fierce and hostile, while by others they are described as honest and industrious traders; it may be that the shores are inhabited by two races of people to whom these descriptions apply. It is, however, generally reputed that the people of the Muni river are savage and intractable, especially to white men, and therefore too much confidence should not be placed in their professions of friendship, but during intercourse to be watchful of their movements in order to guard against treachery.

Directions.—After passing Mosquito point, if wishing to enter the Muni river, the channel will be found between the shoal tongue extending in a NW. direction from the Elobey isles, and the southern edge of a bank, which fronts the eastern part of the great bay, lying between the river and Mosquito point. This channel is from ½ to one mile broad, with depths varying from 3¼ to 6 fathoms, but it is subject to great changes, as the banks off the entrance to the river are continually shifting. No vessel therefore should proceed northward of the Elobey isles without a pilot, or her boats ahead sounding.

Caution.—From a partial examination of the banks off the Muni river, by several of H. M. ships in 1872 and 1873, it was found that the depths and positions of them had materially altered since the survey in 1836 and 1838, therefore every precaution should be taken when navigating in this locality.

Munda river.—This river lies in the SE. angle of Corisco bay, 10½ miles eastward of cape Esterias, and, like the Muni river, the navigation is rendered difficult by banks and rocks. The entrance lies between Akanda point and the east shore of Corisco bay, and is 5 miles across; but the navigable channel is narrowed to little more than 2 miles, between a shoal tongue which runs off 3 miles northeastward from Akanda point, and the

shoal water off the eastern coast. The depths in this channel vary from 3 to 8 fathoms.

Five miles within the entrance, the river branches off into two arms, the smaller known as Nkogue river, taking a SW. direction, intersects the southern shore of Corisco bay and extends to within ¼ mile of Kringer, on the north shore of the Gaboon river, thus forming the peninsula of Esterias; this small neck of land is used as a portage, over which boats are drawn.

Munda isles.—Off the mouth of the Nkogue are the Munda isles, consisting of one large and two very small islets, covered with wood; the largest islet is ¾ mile in length and covered with large trees, which rise in the southern part, and assume a conical form. A little beyond the islets, the river becomes very narrow; the shores are very low and covered with wood, and apparently thickly populated. Both the above rivers abound in redwood and ebony.

A French customhouse and three factories have been erected on Assimba, the most northern of the Munda isles. On Munda island, the largest, there is a village; this is the only island on which fresh water may be obtained in the dry season. At this period water is obtained from the villages on the banks of Nkogue river.

Marabout bank.—A coral bank about ½ mile in extent north and south, which uncovers at half tide, lies west (N. 74° W. mag.), distant ¾ miles from Laval hill, on the eastern side of Munda river entrance.

Bank.—A bank with 7 feet at low water, soft mud, on which the French vessel of war *Le Boursaint* grounded in 1879, lies on the western side of the entrance to the river, with the following bearings: East extreme of Great Munda S. 15° W. (S. 31° W. mag.); and Akanda point N. 41° W. (N. 25° W. mag.).

Middle bank.—Two miles eastward of Munda islets, and nearly in the center of the river, lies a bank of soft mud which dries at low water.

Akanda point.—A mud flat dries for some distance at low water off Akanda point.

Coast.—From Akanda point to cape Esterias, the general trend of the coast is W. by S., with Rocky point about midway between the two. An extensive bank of shoal ground, of an irregular triangular form, extends off the whole of this shore, the apex being 4½ miles N. 9° E. (N. 25° E. mag.) of Rocky point.

Cape Esterias.—This cape which forms the southern point of Corisco bay, is low and wooded, and has a rocky reef extending nearly ½ mile in a northeasterly direction, on which the sea breaks very heavily; while further out in the same direction, and 2 miles off shore, is the edge of the 3-fathom line, on the northwestern extremity of the shoal bank which extends between Munda river and the cape.

At night the winds from the offing make the anchorage off cape Esterias undesirable.

Tides.—The tides at cape Esterias are three-quarters of an hour earlier than at Libreville, Gaboon river.

Pilots.—The Bengas of cape Esterias are nearly all good pilots for the coast, and the Munda and Muni rivers. They are always ready to offer their services to vessels arriving off their villages, and know the coast, especially the French stations of Campo, Bata, and San Bento.

Coast.—From cape Esterias to cape Joinville, at the entrance of Gaboon river, a distance of 8 miles, the coast runs nearly south and is bordered by rocks extending at places a mile off shore, and on which the sea breaks heavily during the dry season. Sandy beaches mark the mouths of the Yocogo, Caléga, Mébanga, Ediongué, and M'Boma rivers. These rivers have openings to the sea during the rainy season, from November 15 to July 15; during the dry season they are closed and the beach is continuous.

The coast presents an almost uniform aspect of wooded cliffs of a height of about 65 feet; Caléga and Ediongué points are slightly distinguishable by large rocks and rugged cliffs of a yellowish color.

Between cape Esterias and Mégombie point (False cape Esterias), are some villages inhabited by the Bengas, the most important of which is Salmé at cape Esterias, and those around the Roman Catholic mission, at a short distance north of Mégombie point. The roof of the chapel is whitewashed and is conspicuous from the offing, which, together with the tall trees, render this portion of the coast easily to be recognized.

Cape Faux, or False cape Santa Clara.—About 1¼ miles to the northward of cape Joinville there is a slight projection to which the French have given the above name; abreast of it the 3-fathom line extends 1½ miles off shore. About midway between cape Faux and cape Joinville is Ukwuéa point, marked by high iron-wood trees. There are two large sandy beaches, one north of the point and the other south of it. South of Ukwuéa point, near Mabendia (a remarkable rocky point), there is a small Roman Catholic village surrounded by banana trees and plantations. There are many offlying rocks between these two capes.

Currents.—In Corisco bay the general direction of the current becomes so modified by the islands and banks, as to render any definite description impossible; but at the distance of 18 miles off shore, in the parallel of cape Esterias, the general direction is northward, while abreast of Corisco island, at a distance of 13 miles, the trend of the current is NE., or nearly in the direction of cape St. John, with a velocity of from one to 2 miles per hour.

Gaboon river.—This river, which takes its rise among the Sierra del Crystal mountains, empties its waters into the Atlantic a few miles north of the equator. Its mouth forms a bay, which is the finest harbor on the

west coast of Africa, and lies on the right bank of the Zaire, forming a settlement of [illegible]

The native name of the town is Mpinga, and like some of the places on the coast of the right of Zaire, may be more properly termed an assemblage [illegible] The entrance is formed between cape Joinville and Pungwa point, distant 3 miles in a southerly direction. The shores of the river, which are covered with a rich vegetation, and interspersed in numerous places with groups of [illegible] a distance of 3 miles, and hence [illegible] a distance of 3 miles. Pungwa point, a promontory [illegible] the entrance [illegible] The Zaire river, to the eastward of [illegible] 2½ miles from it, is [illegible] and may be ascended for a distance of 6 miles, the Zaire river, 1½ miles from its mouth, [illegible] a distance of 4 miles.

The [illegible] is [illegible] the mouth of the Zaire, and its communications [illegible] good water for a boat, is through the [illegible] and [illegible] which [illegible] the entrance under the [illegible] somewhat [illegible] the [illegible] of the [illegible] on both sides of the river.

Cape Joinville or Santa Clara, about [illegible] feet in height, may be recognized [illegible] by the [illegible] which is extensively being cultivated for [illegible] the trees have been [illegible] cleared, as well as by a [illegible] on the [illegible] of a portion of the chalky rock of which the cape is composed. A line of breakers, that may be easily [illegible] and is distant from the cape in the [illegible] of ½ mile, and in foul weather [illegible] from the cape, but the 3-fathom line exends nearly 2 miles in a W. direction, which will [illegible] it is not prudent to approach the cape.

Beacon.—A [illegible] beacon 16 feet high, built of bricks and whitewashed, surmounted by two [illegible] has been erected on cape Joinville, and is visible from a distance of 6 or 7 miles.

Coast.—The right bank of the river between cape Joinville and Owendo point is elevated and composed of picturesque hills of calcareous formation, of which, mount Bouet, is 328 feet high, while a second summit, mount Bandin, 492 feet high, rises about 2 miles further to the southward.

The summit of mount Bouet has been cleared of trees, except one which is 150 feet in height, and a white pyramid with black central line, 39 feet in height, has been erected near it.

Immediately within cape Joinville the shore recedes and forms Akwengo bay, where very small craft may find anchorage during the rainy season only. From cape Joinville to the head of the bay, rocks border the shore, rendering it almost inaccessible; a rock with 6 feet water on it lies in the middle of the bay. A rock which covers at spring tides and dries 6 feet at

low water, forming a small islet, lies ½ mile from shore, between cape Joinville and Akwengo point.

From the head of Akwengo bay to Guegay creek, a distance of 8 miles, the coast is bordered by tall trees that grow down to high water mark. At half tide, a steep sandy beach is exposed, on which the sea breaks heavily in the dry season. Landing is only possible during the slack at low water.

About midway between cape Joinville and Libreville there is a slight elevation with a village on it called Nkogo, at the back of which Nkogo, or Nkogué, river takes its rise and flows eastward, emptying into the Ikoi river.

The Sekwanis, or Bulus, who inhabit the forests, avail themselves of it in their communications with the factories on the right bank of the Gaboon. This tribe differs from the Mpongwe, populating the Gaboon, and although their languages appear to have the same derivation, they are sufficiently distinct to require the use of interpreters.

The Mpongwe, or coast tribes of the Gaboon country, are much divided into classes, whose distinction is kept up chiefly by the restraints on intermarriage. They mostly inhabit the right side of the river for 30 miles up, and live in villages which are chiefly located with particular regard to barter, for these negroes are inveterate traders and are said to be the most intelligent and acute merchants on the coast. Their positions at and near the mouth of the Gaboon afford great facilities, and enable them to monopolize the whole trade with the interior.

The Mpongwe villages, though not extensive, are said to be the neatest and best arranged in Africa; they have generally but one main street, on both sides of which are built the houses, which vary in size according to the wealth of the owner. The houses, always of quadrangular form, are built of a kind of bamboo obtained from a species of palm, whose leaves also furnish mats for the roofs.

The shore of the right side of the Gaboon rises at Guegay creek, and is fronted by chalky beds, which dry out 200 yards at low water. The creek is marked on the north by tall trees forming a big clump, and on the south by Norman point, also called Kringer point.

Between Norman point and Breton point the shore is fronted by rocks, with sandy beaches at the bottom of the coves. Rocks continue to front the shore as far as Glass point, south of which is a small cove where the seine can be hauled.

At the distance of a mile SE. of the creek is Breton point, and close to the shore, between the two, are the villages of Kringer, Kwaben, and Louis, with an aggregate population of about 1,400; of these villages Kringer is the most important.

Settlement.—The blockhouse, erected in 1843, stands on an eminence near the shore, ⅛ mile southeastward of Breton point, and near it is a convenient landing place; it has now been abandoned as a stronghold, and forms part of the garden of the Roman Catholic mission, whose church, dwelling houses, schools, and workshops are in the immediate vicinity. The point on which the mission stands is marked by a yellow patch in the cliff, near which is a landmark. A ridge of rocks which cover and uncover extend for 200 yards off the point.

Libreville.—The government buildings at Libreville consist of three large houses with red roofs; the center one is the residence of the governor, and is surmounted by a tower; a little to the northward is the church of the Plateau, with its red roof and belfry. These are the only conspicuous buildings from the offing. Abreast the governor's house are two small piers forming a small harbor. The hospital and powder magazine are both afloat.

Contiguous to the government house is the village of Libreville, or Freetown, founded in 1849, and inhabited by liberated blacks; and about 1½ miles from the piers, in a slight indentation, between French and Paris points, stands the village of Glass, the principal place of trade in the whole river. Within it on a beautiful hill, named Baraka—derived from barracoon—is the American mission, with numerous buildings and spacious grounds, which occupy the site of what some years since was a noted slave factory.

Libreville cove.—In the middle of the entrance and almost at equal distances from the piers is a rock on which a beacon is built. The channel for boats is midway between the beacon and south pier, where there is 9 feet at low water. The pier heads have loose stones lying off them, and should be avoided especially at low water. At low water the landing place at the north pier should be used.

Météore bank.—The 16-foot edge of this bank extends for upwards of ½ mile from the piers at Libreville.

Shore.—Around Paris point are some rocks, which extend as far as Ogombray creek, whence the shore for nearly 2 miles, to Lohuay creek, is sandy, and forms a slight bay, near the center of which is the village of Roi Glass. A muddy sand bank, Malouine bank, extends off shore for nearly ½ mile.

Lohuay creek, which enters this bay just within Lohuay point, has its mouth obstructed by a bed of rocks awash at low water, which extend ⅛ mile off the point.

Coal.—The French coal depot is situated on the north bank of the river at Libreville. Only patent fuel is supplied, and this may be obtained from the French government stores or from private firms.

Libreville anchorage.—The anchorage is nearly a mile southwestward

of the piers in 4 fathoms water. The best anchorage is southward of the hospital hulk, where the bottom is mud. East of the hulk it is rocky and vessels are likely to loose their anchors. Vessels generally moor NW. by N. and SE. by S. to the flood and ebb. The bottom off Libreville, between the mole and Breton point, at one mile to the northward, is foul and rocky, being full of holes to the distance of one mile off shore. During the dry season (about June to September) small vessels anchor farther in the river, near Owendo point, to avoid the surf which breaks on the shore at Libreville. Between Libreville and Owendo point the shore is fringed with houses, belonging chiefly to the European merchants.

Buoys.—There are several mooring buoys in the outer and inner anchorages, but all are appropriated.

A wreck buoy marks the remains of the wreck of the *Alcester;* vessels must not anchor on it, but may pass over it.

Lights.—Two harbor lights are exhibited at Libreville. The northern light, shown 5 feet within the extremity of the northern pier, is a fixed red light; the southern light, shown 16 feet within the extremity of the southern pier, is a fixed green light. By keeping the three lights (forming a part of the lighting of the plateau) in line bearing N. 59° E. (N. 75° E. mag.), the extremities of the piers and the rock in the entrance of the harbor will be avoided.

A fixed white light exhibited 110 yards west of the government house at Libreville, shows a sector of light over the anchorage inside of Southeast bank.

Supplies.—The vegetables raised by the natives for their own consumption consist of Indian corn, plantains, yams, sweet potatoes, cassava, tania, pumpkins, and groundnuts.

Supplies of eggs, poultry, fish, mutton, and beef can be procured; bullocks are brought by transports, generally from Novo Redondo and Mossamedes.

Coast.—Between Lohuay and Owendo points, a distance of 3 miles in a southerly direction, the shore is low, and bordered with mangroves. A muddy sand bank extends nearly 1½ miles off the small creek, called Loembani, at about midway between Lohuay creek and false Owendo point. Along the whole distance from Norman point, is a road connecting the various villages.

Owendo point projects wedgeways to the southward, and is about 65 to 80 feet high. The Conicué hills, to which the point rises, at about 2 miles northeastward of it, are higher by 160 to 260 feet, and are surmounted by tall trees.

The plateau of Owendo is partially cleared and cultivated; it is healthier than the plateau of Libreville. A Gaboonese village is upon the sea at the SW. slope of the plateau.

Owendo bay, between Owendo and Peini points to the eastward, and Coniquet island, affords good anchorage; there is a strong tide rip in it, but no swell, as at Libreville. The bottom is of mud. The anchorage is either under the shelter of Owendo point, or in the middle of the channel between Peini point and Coniquet island.

Igumé bay.—The space northward of the line which joins Owendo point and N'gumbi point to the eastward is call Igumé bay. It is sheltered from the sea and tide rip but only available for vessels drawing 13 feet and under.

In the depth of the bay is Igumé creek, in which there is upwards of 13 feet water from the mouth for 3 miles up; there is no regular channel into the creek. On the shore is the large village of Alénékeri, and a little further to the northward is the village of Conicué, both villages are Pahuin.

Coniquet (Dambech) island.—This island, well wooded, fertile, and abounding in excellent springs, lies opposite the mouth of the Ikoi river, and its south point is distant from Owendo point about 3 miles in a south-easterly direction. The shore of the island is low along its northern side, but rises to a high conical hill on its southern end, which is faced with perpendicular cliffs.

Ikoi, or Kohit, river is immediately eastward of Igumé bay. A large bank of muddy sand lies off the eastern point of entrance and extends for 1½ miles up the river to where the mangroves cease. The entrance channel is about 160 feet from the rocks bordering the Peini point, which is the western point of entrance; in the channel there is a depth of 13 feet at low water. There is anchorage with good holding ground anywhere in the channel, but the best is off the villages of Ayaya and Rigoho on the left bank, 2 miles above Peini point, where water and some provisions may be procured. At about a mile above the villages, the river divides into two branches; the western branch is called the Macuma; the eastern branch retains the name of Ikoi, and carries 13 feet for 3 miles up to M'bon Mogel. The river is again divided a short distance above M'bon Mogel, the left branch continuing to be the Ikoi, and a mile further up the Nkogo joins it.

The Macuma branch is navigable for vessels of 16 feet until abreast of the small creek which runs at the foot of St. Pére.

Komo river.—This great affluent of the Gaboon has its entrance on the northern side of the head of the inner basin, being separated from the mouth of the Ramboé river by an extensive island. The general direction of the river is east and west, and it is navigable for a distance of 45 miles, in depth not less than 6 feet. It contains a number of small islands, numerous mud shoals, and a few rocks; the shoals often change in position

and extent; the bottom is very irregular and the water suddenly decreases in depth.

The village of Dongila, or Douglas, is situated on the north side of the entrance to Komo river, about 11 miles eastward of Coniquet island. There is a factory at Dongila and a mission house on the heights above.

Komo river is only navigable by light-draft vessels and with the assistance of a pilot.

Surprise rocks lie in the middle of the entrance to Komo river, about S. 9° W. (S. 25° W. mag.), distant 2⅛ miles from the Catholic mission at Dongila village. Irongombéné island, in Ramboé river, touching either the east or west entrance points of that river, lead clear respectively eastward or westward of Surprise rocks. There are patches of 6 feet N. 53° W. (N. 37° W. mag.), distant 2 and 3 miles from Surprise rocks.

Basilic rock is about 18 feet in extent, with a depth of 1½ feet at low water, and from 1½ to 2 fathoms close to; it lies with Assango point bearing N. 71° E. (N. 87° E. mag.), distant 1$\frac{4}{10}$ miles. A patch of 4 feet lies about 1,100 yards N. 89° W. (N. 73° W. mag.) of it. Vessels should pass southward of all these rocks.

Buoy.—A block buoy surmounted by a red ball lies in 15 feet water, at about 300 yards of the southernmost head of Surprise rocks.

By passing ¼ mile to the southward of this buoy a vessel will carry the greatest depth to the river.

Pongara, or Sandy, point, the northern extremity of a low peninsula on the south side of the entrance of the Gaboon, is composed of alluvium, on which the sea has deposited sand, and, although low and wooded, may readily be identified by a remarkable cluster of mangroves, known as Fetish wood, in consequence of idols being kept within its precincts. The elevated land at Gombé point, marked by some reddish spots, and surrounded by some conspicuous trees, 4½ miles southwestward of Pongara point, also serves as a good landmark, especially for vessels coming from the southward.

Funnel beacon.—A beacon, 42 feet high, consisting of a steamer's funnel painted with black and white horizontal bands, and surmounted by a black ball, is situated 340 yards southward of the extremity of Pongara point; it forms a useful mark.

Light.—A light is exhibited on the summit of Gombé point from an iron lighthouse painted black and white in horizontal bands. The light is shown at an elevation of 187 feet above the sea and should be visible in clear weather 17 miles. There is some doubt as to the character of the light. It shows flashes every 30 seconds and is supposed to be a revolving white light.

Rogolay creek.—The coast inside Pongara point takes a general southeasterly trend for 13 miles as far as Obelo creek. From one mile within Pongara point the coast is lined by mangroves as far as the bottom of the

estuary. The shore from the point to Rogolay creek is free from banks; from the creek to Obelo point banks of mud, with sometimes rock, border the coast for a distance of 2 miles off shore. Three miles from the point is Rogolay creek, on the southern shore of which is the town, or village, of Denis. About 1½ miles up this creek is a good watering place, where the water ferments and then becomes good, but the place is only accessible at high water. At the mouth of the creek are two sand banks that dry at low water, and small vessels of light draft might find the northern bank a good place for grounding in order to clean the bottom.

Vingueyahua and Mina creeks.—Vingueyahua creek lies about 1½ miles south of Rogolay creek, and about 3 miles further southward is Mina creek, with a conspicuous red tree a little northward of its entrance, and a clump of trees on a rising ground, known as Ponta Mina wood, nearly 2 miles inland.

Obelo and Bohuin creeks.—At a distance of 5 miles southward of Denis town is the village of Petit Denis, beyond which the shore for 4½ miles is intersected by Apopai, Monbai, Tutiai, and Olohiubao creeks. Obelo creek, immediately eastward of the latter, and Bohuin or Assembé river, 4 miles further east, are the only navigable streams in the outer basin of the Gaboon, and are resorted to for dyewoods; both are accessible to vessels of moderate draft, but the approaches are difficult on account of the shoals fronting them.

The Obelo may be ascended as far as Apubé, a village on the right bank, 3 miles within the entrance, up to which the least water is 12 feet, but thence to Kohue, a mile higher on the opposite side, the depth decreases to 5 feet.

Eguirigui, or Bohuin, point on the east side of the entrance to Bohuin creek is low, with a remarkable tree, and a mud bank extending nearly a mile in a NW. direction. This point forms the southern limit of the outer basin of the Gaboon, and is distant 7 miles S. 5° E. (S. 11° W. mag.) of Owendo point, the northern boundary.

Perroquet island.—This island, which is of small extent, low, thickly wooded, and uninhabited, lies north 2½ miles from Eguirigui point, and 3½ miles from Coniquet island. A bank, which partly dries, extends nearly 2 miles in a NW. direction from the SW. point of the island; and a shoal extends upward of 500 yards off its eastern end.

The channel between Perroquet island and Eguirigui point is very shallow, with patches of stones and broken shell, which dry at low water; that between Perroquet and Coniquet islands has depths ranging from 4¾ to 6 fathoms.

Mangrove and Pommier banks.—The southwestern shore of the Gaboon, from Rogolay creek to Assembé river, is fronted by shoals and mud flats, the northern portion of which is known as Mangrove bank,

extending a mile off shore, having on it from 2 to 6 feet, with 3 and 4 fathoms close to its outer edge.

Pommier bank is a continuation of the former shoal in a southerly direction as far as Obelo creek; it carries from 2 to 9 feet water, and its outer edge abreast of Monbai creek is upward of 2 miles off shore.

Cigognes bank.—On the outer part of the extensive mud flats fronting Obelo creek and Assembé river, and 2 miles NE. of the entrance of the former is Cigognes bank, divided into two parts, with a depth of 2 fathoms between. The bank extends 2 miles east and west and is about a mile in breadth; the western portion always dries, and the remaining portion partially uncovers at low water. Between the Cigognes and Pommier banks is a channel 600 yards broad, and steep-to on both sides, which is said to lead into Obelo creek.

Mafuga and Igumé rivers.—From Eguirigui point, the southern shore of the inner basin of the Gaboon takes an ESE. direction for a distance of 5 miles, as far as Mafuga river, in which there are depths from 16 to 10 feet for a distance of 6½ miles from the entrance; on the left bank of this river are two villages.

The Igumé river lies 4½ miles eastward of the Mafuga.

Ramboé river.—This river lies 4½ miles eastward of Igumé river, and the western point of its entrance is distinguished by a remarkable tree. The Yambi river unites with the Ramboé 3½ miles southward of the low and wooded Irongombéné island, which lies within the entrance of the latter. The depth of water on the eastern side of Ramboé river is about 1½ fathoms for 5 miles within the entrance. Many streams enter these rivers, and numerous villages are scattered along their banks.

A bank of one fathom and less extends northward from Irongombéné island parallel with the eastern bank for a distance of 2½ miles, narrowing the channel to ⅓ of a mile.

Chinchoa village, situated on Ramboé river, will be seen from abreast Irongombéné island. Opposite the village is a good place for small vessels to careen; here the small steamers belonging to the factories established in the Gaboon make good their repairs. Fish and fruit are obtainable at the village. The eastern side of Ramboé river should be kept on entering until abreast of Irongombéné island, whence there is no danger for small craft as far as Chinchoa village. The services of a pilot are necessary.

Thémis bank, in the entrance of Gaboon river, on which the French frigate *Thémis* struck in 1877, lies in the approach to Penelope pass, about 6½ miles S. 51° W. (S. 67° W. mag.) of the beacon on cape Joinville and N. 50° W. (N. 34° W. mag.), 8 miles from the northern extremity of Fetish wood (Pongara point). This patch of sand, about 200 yards in extent, has a depth of 16½ feet over it at low water. A second patch of

18 feet, also about 200 yards in extent, is situated S. 75° E. (S. 59° E. mag.), distant about 1,600 yards from the western patch.

Two patches with similar depths lie N. 29° E. (N. 45° E. mag.) about 1,400 yards, and N. 18° E. (N. 34° E. mag.) 1,400 yards, respectively, of these patches, with deep water between and around them.

Buoy.—A black buoy, with staff and ball, is moored in latitude 0° 26′ 33″ N. and longitude 9° 14′ 20″ E. This buoy should be kept on the port hand in entering the river.

Mouche bank, which lies in a NW. direction from Pongara point, is upward of a mile in length, with as little as 9 feet water, from which depth Funnel beacon, distant nearly 4½ miles, bears S. 53° E. (S. 37° E. mag.).

Buoy.—A large conical staff buoy, with red and white horizontal bands, is moored about 300 yards northwestward of the north extreme of Mouche bank.

West bank.—This bank is a narrow, isolated patch, one mile in length, with as little as 6 feet water, and from this shoal spot, Funnel beacon bears S. 55° E. (S. 39° E. mag.), distant 3¼ miles.

Buoy.—A red conical buoy, marked R, is moored about 800 yards N. 7° E. (N. 23° E. mag.) of the north end of Pongara bank.

Pongara bank is an extensive shoal, running out from the point whence it derives its name in a NW. direction, for a distance of 2½ miles. There is a depth of 6 feet water on its outer end, but in other parts there is as little as 3 feet. This danger is generally distinguished even in fine weather by the passage of the strong tidal current over the shoal ground. There is a narrow channel between this bank and the south end of the West bank, with a depth of 5 fathoms.

Vessels of light draft sometimes pass between Pongara bank and the shore, and also between it and West bank, but on no account should either passage be attempted by a stranger.

The Mouche, West, and Pongara banks occasionally break, and their doing so is mainly attributable to the action of the tides which are strong and cause eddies when opposed to the wind.

Butterfly (Papillon) bank is a small patch, with 15 feet water, and though detached from Pongara bank, is close to its eastern end; it lies with Funnel beacon bearing S. 16° E. (south mag.), distant one mile.

Buoy.—A red conical buoy, marked No. 8, R, is moored northward of this danger.

Postilion bank is about ¾ mile in extent, and as the least water known is 4¼ fathoms, it can only be considered a danger to ships of heavy draft. From the shoalest part, the Funnel beacon bears S. 27° E. (S. 11° E. mag.), 6 miles; and cape Joinville N. 21° E. (N. 37° E. mag.). The bank is generally shown by eddies.

Karaibe bank.—This bank is 1¼ miles in length NW. and SE., with as little as 9 feet water, and is the most important danger to be avoided on the NE. side of Penelope pass, the main channel into the Gaboon. From the shoalest part, Funnel beacon bears S. 11° E. (S. 5° W. mag.), distant 3½ miles, and the summit of mount Bouët N. 82° E. (S. 82° E. mag.).

Buoy.—A small black conical buoy, marked No. 1, N, lies off the west side of Karaibe bank, southward of the shoalest part of the bank.

Middle (Milieu) bank.—The 3-fathom line of this bank is separated from a similar depth of Karaibe bank by a channel nearly a mile wide, having from 5 to 7 fathoms water. The bank itself is about 1¼ miles in length, the least known depth being 2½ fathoms; but as it lies considerably NE. of the fairway boundary of the main channel, it does not affect the navigation of the river.

Southeast bank is narrow, 1½ mile in length, NNE. and SSW., with 2 fathoms on its northern extremity, and 3 fathoms near its southern end.

A detached patch of 3½ fathoms SE., lies about 800 yards from the southern extreme of this bank.

Buoy.—A black buoy is moored near the depth of 3 fathoms on the south head of Southeast bank.

Caution.—The positions of the buoys in the Gaboon river are not to be depended on. In August, 1881, the numbers on the buoys were not discernible.

Vialetes rocks.—A coral patch, consisting of 3 distinct heads, having respectively 13, 19, and 21 feet on them at low water, lies about S. 21° E. (S. 5° E. mag.), distant about 5⅓ miles from Cape Joinville beacon. The exact position, however, not being known, they render the passage between Nisus and Karaibe banks dangerous. Eddies mark the rocks.

Nisus bank, 2¼ miles in length, nearly north and south, is formed of irregular depths varying from 5 fathoms to 6 feet; this latter depth is on the west portion of the bank. The extreme south end of the bank with 2½ fathoms, is 1¼ miles N. 5° W. (N. 11° E. mag.) of the 9-foot patch on Karaibe bank.

Buoy.—A red conical buoy is moored in 16 feet water, north of the northern edge of Nisus bank, with the beacon at Cape Joinville bearing N. 29° W. (N. 13° W. mag.) and the tree on mount Boüet S. 79° E. (S. 63° E. mag.).

Recherché bank, with 2 fathoms water, lies off Akwengo bay, within cape Joinville, with an intervening passage ⅜ mile broad, carrying 4¼ fathoms, between it and the Nisus bank.

Adour bank extends 1⅓ miles to the SW. from Pandinu point, midway between cape Joinville and Libreville. In the dry season, the sea breaks on two patches of rocks.

Alligator shoal, nearly a mile in length, and with as little as 9 feet water, lies over on the NE. shore near Guegay creek, and is separated from Adour bank, which is connected with the shore by a channel ½ mile wide, having from 3½ to 5 fathoms water. This shoal is only in the way of vessels taking the passage either north or south of Nisus bank.

Supplies.—Fresh provisions, such as goats and poultry, may be obtained at the villages on the eastern shore. Beef can be obtained at Libreville, bullocks being brought from Mossamedes and Novo Redondo. Water is plentiful on both shores, but on the eastern side there are rivulets which run into the sea, whence supplies may be procured, but only at low water. The watering place in Akwengo bay, just within cape Joinville, is the best in the Gaboon.

Tides.—It is high water, full and change, at Libreville, at 5h. 20m.; springs rise 8 feet; neaps 2½ feet; at Pongara point at the same time as at Libreville, springs rise 6 feet and neaps 3 feet; in Igumé bay, the tide is half an hour later than near Libreville; the rise of tide is the same. The tides are strong and irregular; the flood runs to the northward outside the shoals, thence strongly past cape Joinville and up the river, setting to the NE. when abreast of the Karaibe buoy, but regains the channel before reaching the Southeast bank; the flood runs at springs at the rate of from 1½ to 2 knots an hour, while the ebb, which often runs in the port 10 hours and frequently attains a velocity of 4 or 5 knots, runs out fairly in the channel, and sets to the southward outside the entrance. Thus, when entering or leaving the Gaboon by the Penelope pass, the tendency of the tide is on the flood to set a vessel towards the eastern shoals, and on the ebb, towards the western.

Freshets occur in the Gaboon principally during the rainy season; they are, however, occasionally experienced at every period of the year, and are sometimes sufficiently violent to interrupt, for several days, communication with the left bank.

Bores occur during the dry season, at which times the outer shoals break, and the shore at Libreville is difficult of approach. A heavy swell sets into the estuary, but communication with the shore is seldom interrupted by it.

Winds and weather.—Nearly throughout the whole year the breezes at the mouth of the Gaboon alternate from land to sea, thus permitting the entry or departure of vessels under sail. The sea breeze sets in generally during the afternoon, but sometimes as early as 11 a.m., and lasts until evening, varying from SSW. to NW.

The land breeze, which begins between 8 and 9 p.m., blows from SW. to east during the night, and ceases from 8 to 9 a.m.; between the two winds, calms or variable airs prevail. The heaviest tornadoes occur in

March and April, but storms of a less violent character may be experienced at any time. The harmattan is said not to be felt in the Gaboon.

The winds along this part of the coast between June and October are variable during the twenty-four hours, and range from SSE. to SSW., and thus vessels beating to the southward should take advantage of every slant, and keep the gaining tack. They should also manage to be in shore toward the early morning, in order to benefit from the land breeze.

Tornadoes are quite severe from February until the end April. They ordinarily commence about sundown; the SW. wind then dies away, and the tornado commences first from the NE., hauling gradually to east, and attains its greatest force at SE., at which point it ceases. When a vessel is at the anchorage, swung to the flood, at the approach of a tornado attention must be paid to the moorings and to the boats at the boom, for the tornado then takes the vessel broadside on. When the tornado is over the prevailing wind is resumed.

Current off the Gaboon.—The current generally runs to the northward about $\frac{3}{4}$ mile an hour, but the direction is sometimes changed to the southward with change of moon.

The direction of the current is influenced by the tidal stream.

Anchorages.—Good anchorage will be found along the right bank of the Gaboon, between Breton and French points, in from 4 to 6 fathoms, about one to $1\frac{1}{2}$ miles off shore. Good anchorage with muddy bottom will be found on the plateau off Glass at from $\frac{1}{2}$ to $\frac{2}{3}$ mile off shore. If wishing to anchor further to the southward, care must be taken to avoid Malouine bank, which extends $1\frac{1}{4}$ miles off Paris point, and thence with an undulating outline the shoal water preserves about the same distance from the shore nearly as far as Owendo point.

During the fine season vessels may anchor off the southern shore between Pongara point and Rogolay creek, in about 7 fathoms mud, but during the tornado season this anchorage is dangerous. Vessels bound to Obelo creek for dye wood, anchor off Cigognes bank.

Pilots.—There are no pilots for the entrance of the Gaboon, but nearly all the natives of cape Esterias are acquainted with the channels.

Directions.—When in the vicinity of the Gaboon river and uncertain of the exact position of the ship, it would be well to remember that the land on the north side of the estuary is high when compared with that to the southward, which is very low. If approaching the northern coast from seaward, the trees on the Esterias peninsula will be seen from a distance of 12 miles, and on a nearer approach cape Esterias will make like an island. On opening out the mouth of the river, the summit of mount Bouët, 328 feet high, the most elevated bank of the Gaboon, will be easily identified.

Vessels from northward should endeavor to make cape Esterias, which may be passed at the distance of a mile, in 6 and 7 fathoms water. If in

consequence of fog or approaching night, the marks through the channel can not be seen, it would be prudent to anchor, and if the ebb be running, it would also be advisable to anchor, if in a sailing vessel, as the ebb stream, which sometimes attains the rate of 4 or 5 knots an hour, can not be stemmed without a fresh sea breeze.

The broadest, most direct, and therefore safest channel into the Gaboon, is the one known as Penelope pass, and in approaching it from the northward, light-draft vessels should keep an offing of 3 miles from cape Faux, the western extremity of cape Joinville, and when cape Faux bears N. 74° E. (east mag.), a course S. 16° E. (south mag.) will lead between Thémis and Postillion banks. As strangers might possibly mistake the high clump above Bleben, for the low point of Owendo, which can not be seen from the entrance outside Karaibe bank, it would be advisable to bring Cape Joinville beacon N. 26° E. (N. 42° E. mag.), and the summit of mount Bouët N. 85° E. (S. 79° E. mag.); from this position the leading marks through Penelope pass, viz, Ikana point on the south end of Coniquet island open of Owendo point S. 55° E. (S. 39° E. mag.) should be on, and with this bearing of the island a vessel may safely advance from the above well-defined position until the low land of Owendo point can be distinguished. The leading mark is only available in clear weather and then not until reaching Karaibe bank.

Continuing with these marks on, past Karaibe and Southeast banks, an anchorage may be selected as most desirable off either bank of the river, taking care to make allowance for the strength and direction of the tidal stream.

Heavy-draft vessels are recommended to pass about 6 miles west of cape Joinville and westward of Thémis bank before entering Penelope pass.

If the buoys marking the Thémis, Mouche, Karaibe, and Southeast banks be in position, they alone will serve to point out the channel, and in the event of the buoy of the Southeast bank being gone, a good mark to clear the south end of the shoal will be the commandant's house, in line with the summit of mount Baudin, N. 63° E. (N. 79° E. mag.). If entering with the flood tide, the set toward the Karaibe bank must be carefully guarded against.

There is an available passage for small vessels between Nisus and Recherché banks, but it is not recommended, as there are no leading marks; another channel which is sometimes used, but not by strangers, lies between Nisus and Karaibe banks.

There is also a practicable channel between Middle and Southeast banks, and vessels taking this route alter course from the leading mark through Penlope pass, when Gombé point is shut in with Wingombé point, and thence steer for the Roman Catholic church on an N. 80° E. (S. 84° E. mag.) bearing; but as in either of the above cases the saving of time

would be inconsiderable, the Penlope pass is recommended, especially to strangers.

Caution.—Great care should be taken in all these passages to guard against the tides, by attention to the marks and lead.

From the southward.—Vessels approaching the Gaboon from southward should first sight the trees over Gombé point (lighthouse on point), which will be seen from a distance of 5 or 6 miles, and when abreast of the point the land about cape Joinville should be seen. Do not bring the trees on Gombé point to the southward of S. 21° E. (S. 5° E. mag.) until cape Faux bears N. 23° E. (N. 39° E. mag.), when course may be altered to round Mouche Bank buoy, and pick up the leading mark for Penlope pass, as previously directed.

Sickness.—Like all equatorial countries, the Gaboon is subject to malarial diseases. The fevers, when not carefully watched and attended, rapidly take a prejudicial character and carry away those who are too late in receiving proper treatment. Change of place and climate has been found to be advantageous in all these fevers.

The coast.—From Gombé point to cape Lopez, the westernmost point of South Africa, the distance is nearly 65 miles SW. by S., the intervening coast falling back into a bight 23 miles deep. The southern part of this bight is known as Cape Lopez bay, and here the land becomes broken by the mouths of several rivers, the principal of which is the Ogowé river, while the approaches to the shore are shallowed by the delta of the various streams.

The shore from Gombé point to the equator trends in a southerly direction, and is moderately high and very level, with a narrow sandy beach which is intersected by several creeks. About the equator, at the distance of 3 miles inland, is the northern shoulder of a line of hills, or downs, about 100 feet high, which continue southward in a direction parallel to the coast, for a distance of 15 miles. In latitude 0° 4′ S., one of these downs is very remarkable, being composed of sand, covered with scrub, with a cliff on its western side; it shows above the trees which skirt the shore, and assumes from seaward a reddish tint. The northern side of this down forms a gentle slope to the summit, which is nearly horizontal, and falls suddenly on the south side; when seen from eastward it assumes a distinctive character and forms a good landmark. Abreast of it, near the sea, is a village.

At the distance of about 7 miles further south, at the termination of the range of downs, is another remarkable hillock, white, bare, and flat-topped, which is also seen above the trees of the coast.

Soundings.—From the Gaboon to Sangatanga, the soundings are remarkably regular, excepting off the paps, where a bank extends some miles to

seaward, having generally from one to 2 fathoms less water than is found north or south of it.

Water.—In latitude 0° 2′ S., good water may be procured from a river which flows into a small bay, and its position may be recognized by a sudden break in the trees. The best anchorage off the bay is in 6 fathoms, mud, about 3 miles off shore, with the northernmost pap bearing S. 19° E. (S. 3° E. mag.), and the break in the trees S. 89° E. (S. 73° E. mag.); closer in the bottom is rocky. Boats may land in the corner of the bay, except when the rollers set in heavily. The mouth of the river occasionally shifts as much as ½ mile in a short space of time.

Reef.—In latitude 0° 12′ S., there is a reef upon which the sea occasionally breaks, stretching a mile off shore in a westerly direction. This danger should be avoided, especially by boats cruising at night; there is an appearance of a passage between this reef and the shore.

The Paps are two round hills, which form good landmarks, between latitude 0° 13′ S. and 0° 15′ S.; they lie north and south of each other, and are about 2 miles from the coast. On the shore midway between the Paps, is a running stream of good fresh water, and near it is a remarkable round clump of light-green trees close to the beach, on which sometimes there is very little surf. It is, however, necessary to be cautious in landing, both on account of the surf and the natives who are fierce and treacherous.

Fanaes islet.—This small wooded islet lies in latitude 0° 25′ S., abreast the mouth of a small stream of water, from which it is distant about a mile; in the passage between there is only a depth of 6 feet.

Villages.—Nearly abreast of Fanaes islet, is a village, and behind it is a considerable clearing extending also down to the beach, which is fringed with single trees, while on either side the wood is dense close to the water's edge. Within this village, which can not be seen from seaward beyond a distance of 6 or 7 miles, is a long row of houses, on the ridge of a hill bare of trees, which may be easily distinguished 14 or 15 miles off. In the center of the town is a flagstaff, on which the Portuguese colors are sometimes hoisted.

On standing in, the soundings decrease regularly from 13 to 3 fathoms, in which depth a vessel may anchor about 2½ miles from the land, with the Paps bearing N. 40° E. (N. 56° E. mag.), and the low village S. 83° E. (S. 67° E. mag.).

Mount Sangataõ.—This hill rises 7 miles from the shore, and presents from the westward a nearly horizontal summit, with a gradual slope towards the south; in clear weather it may be seen from a distance of 20 miles. Though of slight elevation, the mount shows out well above the low wooded coast, and is the best mark for recognizing Sangatanga.

Sangatanga bay.—This bay forms a slight indentation in the coast 4½ miles broad and one mile deep; its northern point, Sangatanga, being

5 miles to southwestward of Fanaes islet. The shores of the bay are low and wooded, with a narrow sandy beach, and terminate southward in Tambenione point, which lies NW., 6 miles from mount Sangataõ. From northward, the point assumes an arched form, and shows out somewhat as a salient feature from seaward.

Off Tambenione point, a reef of rocks extend ¾ mile in a westerly direction, while an extensive bank of shoal ground runs off to a distance of 6 miles in a northwesterly direction. On the extremity of this bank there is a depth of 2 fathoms, with only 3 feet, 2 miles within the edge, and there is every reason to suppose that the edge of the bank continues with an irregular outline to about 1½ miles outside Fanaes islet, but as the approaches to Sangatanga bay are but imperfectly known, the greatest caution is necessary.

Just within Tambenione point, is the mouth of a small stream, on the right bank of which, and visible from seaward, stands the town of Sangatanga.

Lee Shoal.—This danger, with only 9 feet water, was discovered by H. M. S. *Lee* striking on it in 1864. It lies N. 71° E. (N. 87° E. mag.) of cape Lopez, N. 61° W. (N. 45° W. mag.) 10 miles from Tambenione point, and is apparently an outlying head of the immense bank that nearly fills up Nazareth bay.

Ogowe, or Nazareth, bay is the name given to the deep opening in the coast, formed by the Ogowe or Nazareth, and other rivers, emptying into the sea. It is comprised between N'gueze, or Wézé, and Fetish points, a distance of 6 miles.

The mud brought down by the rivers has almost filled the bay with an immense shallow bank, that nearly dries in many parts and which extends northward for a distance of 6 miles off Fetish point.

On the eastern side of the bay are the following rivers: Wézé river, entrance closed by a mud bank; Abua Uiri river, up which a small vessel can proceed and procure fresh water, and Lisboa river, which is navigable, having the large village of Lisboa on its banks, where fresh provisions can be procured. The entrance to this river has mud banks on either side which uncover at low water.

At the bottom of the bay are the N'chile, or Adue and the Gangue rivers; they are navigable for small steamers and communicate with Ogowe river to the westward.

The whole western side of Ogowe bay, between Fetish point and Ogowe river is fronted by an extensive sand bank which uncovers in many places at low water.

Caution:—All the soundings off Sangatanga and inside of Cape Lopez are very irregular, and it is necessary that great caution should be exercised when navigating this locality.

About 3 miles within the entrance points of the bay, at the mouth of the Ogowe river, are three small wooded islets, the largest and western of which is Gubie island; the others are Ningue and Gogue, the eastern and smallest.

Ogowe, or Nazareth, river.—The mouth of the Ogowe enters the sea, in the bay known as Ogowe, or Nazareth bay of which Fetish point forms the west extreme. It is fronted by flats which extend about 11 miles off the entrance of the river, with a general depth of about 9 feet at low water. These flats are subject to frequent change, and as the bottom is hard sand, and the sea breaks heavily at times, particularly in the dry season, entrance to the river should not be attempted without the assistance of a pilot, who may be obtained at Lisboa village.

N'gola on the right bank, about 20 miles above Gubie island is the customs station and that for pilots. The small sailing vessels which trade on the river stop here, on account of the tide.

The river is navigable for small steamers of 8 feet draft in the rainy season, for about 130 miles, to Lambarene island, where the French Resident resides; here are also English and German factories, and French and American mission stations. This island forms the west side of Rando river, the eastern entrance to lake Zonangué. The village of Lambarene is apparently a few miles higher up, on the opposite side of the river. Probably, vessels of the draft mentioned can go higher up, as far as Ngunie river. In the dry seasons the river is only navigable for craft of about 3 feet draft. There is communication with the Fernan Vas from the Ogowe by the Agulé branch.

Bar.—Directions.—To enter the river: Small steamers from the northward should skirt the coast from Sangatanga point at a distance of 4 miles, steering for Fetish point to avoid the shoals off the coast; the islands will open out from N'gueze point, first Gubie island, which from a distance, appears to be surmounted by a small hill; thence Ningue island, and when it is entirely open of the point, the opening having the appearance of a white line in the midst of the dark background, steer for it, taking care not to widen the opening; thence avoiding the shoals off Wézé point, pass close eastward and southward of Gubie island to avoid the shallows extending nearly across the channel from Gogue island (here there is a depth of but 4 feet at low water in the dry season); thence keep the concave side of the river. Snags are dangerous, many of them being partly embedded in the bottom, rendering extreme caution necessary. The water from the river discharges at the rate of one to 2 knots in the lower part during the rainy season, and from 3 to 4 knots in the upper part; that in the lower part being much reduced by the water dividing into the numerous mouths of the Ogowe. There is probably little or no current in the delta during the dry season.

Pilots.—Natives who have some knowledge of the river will be obtained at Lisboa; also at N'gola for the rivers above that place.

Supplies.—Fresh provisions may be obtained at N'gola or Lisboa village, at the entrance, where also is a customhouse. Fire wood is plentiful at many of the villages on the river. The principal products of the district are ebony and india rubber.

Seasons.—There are two dry and two wet seasons in the Ogowé district. December, January, and June to August being the dry months; the remainder being the wet months. The temperature in the dry months is about 72° at night, increasing to about 86° during the day; in the wet season the heat is oppressive, ranging from 80° to 90°. From the end of January to April the rains are partial, causing the river to rise and fall alternately; in April the steady rains set in, and the river reaches its maximum in May, after which it falls rapidly, being at its minimum in July and August. In September the rains in the upper river cause the second rise, which is at its maximum by the end of November, when it again falls. The river is not so high in November as in May. December and January is the short dry season.

Yombé mouth.—The Yombé mouth of the Ogowe, has only about 2 feet water over the extensive flats which bar its mouth. Steam launches or vessels of about 4 feet draft can enter the Ogowe from Lopez bay by this mouth at about half flood. This mouth appears to be the true entrance to the Ogowe.

Kondyo mouth, eastward of the Yombé is much wider than the latter, but the depths over the flat fronting it is apparently only about 2 feet, as in the Yombé. The stream, though checked by the flood, is stated to be always setting out, but probably this only applies during the rainy season.

Death island, off the mouth of the Kondyo, is small, with its shore more elevated than the neighboring low land; on it are some cocoanut trees.

Fetish, or Apumanda, point.—This point is low, with a sandy beach at its extremity. Off the point, the 3-fathom line extends in a northerly direction to a distance of 5½ miles, whence it takes a general direction of SW., and with an irregular outline continues to the bottom of Cape Lopez bay, preserving a distance of about 3 miles from the southeastern shore of the bay.

Near the extremity of the point is Fetish town, but most of the houses are in ruins, the greater part of the population having migrated to Sangatanga.

Cape Lopez bay.—This bay lies between cape Lopez and Fetish point, a distance of 17½ miles, and runs back in an angular form southward, for a distance of 10 miles, the shores of the bay being very low and covered with mangroves.

The depth of the bay into which the Lopez, Yombé, and Kondyo rivers

run is full of shoals, and must be approached very carefully, the western, or Cape Lopez, side of the bay is the deepest, and affords anchorage for 3 or 4 miles south eastward of Prince point, which may be known by its remarkably beautiful group of trees close to the beach.

Prince rock.—Off Prince point, a spit runs out in a NE. direction for a distance of 5 miles, with only 2¼ fathoms on Prince rock, situated at its outer end, which is steep-to, having 10 to 30 fathoms close outside of it. Between Prince rock and the shore, the depths are shallow and irregular, and vessels are recommended to pass north of Prince rock.

Buoy.—A buoy, with staff and ball, painted red with white band, placed in 5 fathoms water, marks the NE. extreme of Prince bank, or rock. It must not be depended on.

Talisman bank.—About 1½ miles S. 33° E. (S. 17° E. mag.) of Alongubana point, and extending ¾ mile from the shore is Talisman bank, with a depth of 1½ fathoms. Halfway between the outer end of the Talisman (which is steep-to) and Alongubana, is a depth of 1½ fathoms, with 4½ fathoms ½ mile NE. of it, falling suddenly into deep water.

Hound rock, reported to exist about ½ mile eastward of Watering Place point, has been unsuccessfully searched for.

Anchorages.—Good anchorage may be obtained in Cape Lopez bay in from 7 to 8 fathoms, mud, with the south point of Death island bearing east (S. 74° E. mag.), and the point south of Watering place S. 57° W. (S. 73° W. mag.). Also north of Talisman bank in 14 fathoms, mud, with Alongubana point bearing N. 61° W. (N. 45° W. mag.), distant about 600 yards.

Prince bay.—This bay is between Prince point and cape Lopez, and anchorage will be found close to the head of it, on the edge of the flats off the mouth of the lagoon, during the months of August and September, as then the wind is invariably from the southward; but in October, easterly winds sometimes blow, and in the tornado season vessels must proceed to the anchorages already described.

Caution.—Great care must be taken in approaching this anchorage, as the water shoals very quickly inside 15 fathoms.

Cape Lopez.—This point, which lies in latitude 0° 36′ S., longitude 8° 43′ 40″ E., is the southern limit of the bight of Biafra, and as before observed, the westermost point of South Africa. The promontory was originally named Lopo Gonzalves by the Portuguese (in 1469), and though, from its salient position, it is easy of recognition, the term cape seems misapplied, for the point is composed of a low sandy beach, covered with mangroves. It is the northern extremity of a low wooded island, 21 miles in length, NNW. and ESE., its breadth being 4 miles, and separated from the main shore by a mouth of the Aranga river, which flows into the depth of Cape Lopez bay, and to which the French have given the name of Lopez

river. From northward the cape makes like an island, and the large mangroves which surmount its scrubby vegetation may be seen from a distance of 15 or 16 miles.

The former extreme of cape Lopez is now under water, forming a spit, on which there is a depth only of 2 fathoms at 1½ miles or more from the mangroves. It was on this spit that the French transport *Loiret* struck in 1876. As it is a matter of extreme difficulty to judge the distance from this point, when rounding it, it should be given a wide berth. Strong eddies and discolored water exist in the neighborhood of the spit.

Settlement.—In Cape Lopez bay is the settlement named Mandji, with factories. This was the first settlement of the Brazza mission.

Current.—Off cape Lopez from the distance of from 10 to 20 miles, H. M. S. *Frolic* experienced a current setting SW. at the rate of nearly ¾ mile an hour; and the French vessel of war *Segond* found a current setting to the SW. at the rate of 2 miles an hour at a distance of 2 miles from the cape.

Tides.—It is high water, full and change, in Cape Lopez bay, at 4h. 30m.; the approximate rise being from 4 to 6 feet. At the anchorage in the bay, the stream for several days in succession has been found to set out, the force being lessened during the flood. The maximum strength was about 2 miles an hour.

Supplies.—Fish are plentiful in Cape Lopez bay near the anchorage, and the seine may be used with advantage around and in the vicinity of Death island. Wood is obtainable, and buffalo and wild boar may be shot on the plains; fowls and eggs may be obtained on rare occasions. The supply of water from the spot marked "watering place" must not be depended on.

Navigation in the gulf.—To make the Gaboon from Princes island, vessels have to cross the South Guinea current, setting NE., NW., and sometimes north, and to counteract the effect of this current should steer as if to approach the land to the southward of the river; but if the vessel should make the land in the neighborhood of cape St. John, it would be better, in order to reach the Gaboon, to work ship near the coast so as to profit by the alternating land and sea breezes rather than to struggle against the current in the offing; by thus maneuvering the current will be less strong and the tides can be utilized.*

In leaving an eastern point of the North Guinea coast for a western point of the same, the starboard tacks must be carried sufficiently far to leave the North Guinea current, to enter the Equatorial current, and, according to the season of the year, to cross the line to the southward and find winds from south or SSE.; then take the port tack and steer to

* In September and October the currents are sometimes reversed, and drift the ship to the southward of the Gaboon, instead of to the northward, which is safer.

westward of the desired point so as to counteract the effect of the North Guinea current, which will again be met in latitude 2° N.

If this board does not suffice to reach the coast west of the point of destination, another tack must be made for latitude 2° N., and the starboard tacks kept aboard until sufficient westing is made to stand in for the land; in this way the destination will be reached in a few days. Some vessels, that have attempted to beat along near the land, have been thirty and forty days going from Cape Coast Castle to Grand Bassam, and then obliged to give up the idea of going farther westward. Still, in the rainy season, and during the harmattan (from October to March), the currents near the coast are sometimes very light and sometimes even reversed and setting westward. Vessels might then make westing by beating along the shore, utilizing the alternating breezes which are frequent at that time. It is not recommended to try the plan unless the distance to be made is a short one.*

In leaving the island of Fernando Po, it is necessary first to beat along the land, making use of the land and sea breezes and the tidal currents, and finally to stand to the southward until the Equatorial current is reached.

The easterly current in the Fernando Po channel is stronger than it is west of the island, so that it is preferable, in leaving the island, to gain the offing from its western side, if contrary winds are to be struggled against in making the Bonny or the Kalaba.

In leaving Princes island, vessels will carry their starboard tacks, with the wind from SW., as far as the neighborhood of the coast permits, and then leave the gulf on the port tack.

Vessels leaving the Gaboon or the islands in the bight of Biafra in May, June, July, etc., or in the season of south or SW. winds, will have the wind abeam and favorable for making a direct course to any point farther to westward; but in January, February, March, etc., when the south and SW. winds are not well established in the southern part of the bight, they must maneuver, as before directed.

In leaving the head of the bight of Benin to make Princes island or the Gaboon, it is prudent to steer two points to windward of the direct course, to allow for the influence of the NE. currents, which are so strong hereabouts that in steering direct from the Benin or Niger river for St. Thomas island it is doubtful whether the real route would double Princes island. If the Gold, or Ivory, coast is the point of departure, there will be stronger winds to help overcome the NE. currents; but if, on the contrary, the departure is from the head of the bight of Biafra, from Bonny, or from Fernando Po, it is prudent, if bound to the Gaboon, to stand far enough to the westward to recognize Princes island.

* It has been observed that after the full and change the general currents of the gulf of Guinea, near the land, is often westerly, thus giving facilities for short runs in that direction.

CHAPTER XIII.

FERNANDO PO, PRINCES, SAN THOMÉ, AND ANNOBON ISLANDS.

Remarks.—A line drawn N. 33° E. (N.48° E. mag.) and S.33° W. (S.48° W. mag.) will nearly pass over the four islands situated in the bight of Biafra. Fernando Po, the largest and most northern; Princes and San Thomé, the central; and Annobon, the outer and most southern. They lie about equidistant from each other, and are probably the result of the same submarine upheaval.

The volcanic disruption may be traced by the abrupt declensions and needle-shaped peaks, the basaltic and ferruginous rocks of which the islands are composed, and by the black sand and scoria found along the shores.

FERNANDO PO ISLAND.

Fernando Po.—This island, which from its size and geographical position, is the most important in the bight of Biafra, lies between the parallels of 3° 13′ and 3° 48′ N., and the meridians of 8° 25′ and 8° 58′ E.; it is rectangular in form, with a length of 35 miles NE. and SW., and a mean breadth of 17 miles. The island was discovered in 1471 by Fernao-do-Poo, a Portuguese noble, after whom it was named; its present appellation, therefore, is a corruption of the proper name. The island is now a Spanish possession, having been exchanged by treaty in 1778 for the island of Trinidad, off the eastern coast of Brazil.

A ridge of mountains traverses nearly the whole length of the island, and culminates in a magnificent cone, named Clarence peak, the summit of which is 10,190 feet above the sea, and almost constantly enveloped in clouds. It has been considered doubtful whether the peak can yet be considered extinct, as smoke is said to be occasionally seen.

When seen from seaward, the island of Fernando Po is one of the most beautiful objects in the world. Clarence peak is visible from the westward on a clear day or after a tornado from a distance of 100 miles, but generally the weather is so hazy as to prevent its being seen beyond 3 or 4 miles. There are also two smaller peaks near the SW. extremity of the island, but of diminutive height, when compared with their stupendous neighbor. The channel separating Fernando Po from the base of the Kamerun mountains on the mainland is 19 miles across.

Products and supplies.—The forests of Fernando Po produce a great variety of trees, of which many are very valuable for shipbuilding and commercial purposes. Many of these trees attain gigantic heights, and measure 150 feet from the base to the first branch.

The sugar cane grows wild and in great abundance. Yams also are produced in great quantities and are esteemed the finest in Africa. They form the principal article of food of the inhabitants. There are numerous streams in the island, and the water is described as being remarkably pure; but they are much infested with alligators.

The island is much resorted to by vessels to obtain supplies of wood, water, and coal. Provisions, however, excepting yams, are neither abundant nor cheap.

Population.—The natives of Fernando Po belong to the Adeeyah tribe, but are known to Europeans as the Boobées, from their word of salutation, signifying stranger. They are a peculiar race, and differ in their physical characteristics and language from their continental neighbors, though they retain, in a modified degree, the superstitious prejudices and debasing customs which characterize the natives of the mainland.

Although of an unprepossessing appearance, and warlike among themselves, they are said to be friendly, hospitable, and forbearing to white men, while in physical conformation they are, as a rule, well made and muscular.

Their skin, which is of a brownish black color, is frequently daubed over with red or yellow ocher, and with the exception of a few tufts of dried grass around the middle, both sexes appear in a state of nudity, having for ornaments necklaces of beads, chicken bones, shells, and other rude ornaments of savage life. Their habitations are extremely rude, being composed of four uprights, covered with a coarse matting of palm leaves, and of fifteen or twenty such sheds are their towns composed, the sites being the bare crests of the midland slopes.

In 1878 the population of Fernando Po, including Annobon, numbered 5.590.

Maidstone bay.—Cape Bullen, a salient point of moderate elevation, surmounted by many tall trees, is the northwestern extremity of Fernando Po; around its base are numerous rocks close in shore, most of them above water. From this cape the coast runs nearly straight for 13 miles to cape Horatio, being indented by a number of small bays and coves. Maidstone bay is the principal, and forms the best anchorage in the island. It is 5 miles across from cape Bullen to Fernanda point, and about one mile in depth. The soundings gradually decrease from a depth of 24 fathoms to the shore.

Gravina bay, or, more properly, roadstead, lies close to the westward Pilon point, and by many is preferred as an anchorage to Clarence cove.

Navigation Lieutenant T. Roberson, of H. M. S. *Dance*, 1868, remarks: "Ships intending to remain at Fernando Po for some time will do well to anchor in Gravina bay, as far off shore as convenient, as it will be cooler than if closer in, and the ship will be free from mosquitoes. A good berth will be found about ½ mile off shore, in 17 fathoms, with the eastern extreme of Adelaide islets in line with a large house, with veranda and balcony, in Clarence cove."

If intending to coal, a berth closer in will be found in 11 fathoms, with the northern extreme of Adelaide islets in line with a large solitary tree on Fernanda point. A vessel should not go closer in unless for a very short time, especially in the tornado season, for they frequently blow right on shore.

Coal.—The coaling depot for vessels of war and the African mail steamers is in Gravina bay; the sheds are close to the beach.

About 500 tons of patent fuel are kept in stock; coaling by lighters, and not liable to be interrupted by the weather. From 50 to 100 tons may be put on board per day.

In August, 1890, there were 2,000 tons of coal in store, but the patent fuel and a considerable portion of the other coal was in bad condition, having been exposed to the weather. The Welsh coal, under cover, was in good condition. The lighters were much out of repair.

Pier.—A coaling pier, to be 120 feet long, is in course of construction.

Venus bay, or Cockburn cove, lies close eastward of Gravina bay and is about ⅓ mile across between Pilon point and Cristina point, the latter being ½ mile southwestward of Fernanda point. In the depth of the cove is Cockburn brook, a running stream which flows into the sea through a sandy beach.

The shores of the cove are on the whole high, rocky, and steep, and are fringed with rocks above and below water. Off Pilon point the 3-fathom line extends nearly 200 yards, with only 3 feet close inside it; and off Cristina point 100 yards, while in the bay, will be found the depths of 7 to 9 fathoms.

Cristina, or Adelaide, point, is a salient peninsula, surmounted by a small hill, and terminating in steep cliffs. On its east and west sides are Jacob's ladders or stairs, by which the summit is reached. Lying off Cristina point to the northward, 200 yards distant, are the Enrique islets.

Enrique, or Adelaide, islets consist of three large rocks, which are connected at low water, and extend about 300 yards in an east and west direction. The eastern and largest of the group lies 200 yards distant from Cristina point in a northerly direction, with a deep water channel between of 5 to 8 fathoms.

Shoal water extends northeastward of the eastern islet, with only one fathom at 200 yards distant; and 150 yards S. 85° W. (N. 80° W.) of the

western islet is a patch of 1¼ fathoms. Northward of the islets shoal water extends for about 100 yards.

Fernanda, or William, point is the northern extremity of a rocky peninsula, about 70 yards broad, which projects about 600 yards in a NW. direction. It takes the form of a curve, with its concavity toward the west, and is continued under water by a shoal bank, with several patches of 4 feet, whose 3-fathom boundary lies 300 yards westward of the point.

Lights.—A fixed red light, 96 feet above the sea, is exhibited from an iron post near the extremity of Fernanda point, and visible, in clear weather, 6 miles. A white light is shown from end of pier when mail steamers are expected. A green light is shown on the cliff above the white light. These two lights, in line S. 54° E. (S. 39° E. mag.), lead in. The regular exhibition of these lights should not be depended upon.

Buoy.—Fernanda Point spit buoy is red, with staff and cage, and is S. 85° W. (N. 80° W. mag.), distant 550 yards from Fernanda Point light. The position and description of the buoy can not be depended upon.

Santa Isabel (Clarence cove).—This bay, or cove, on the eastern side of Maidstone bay, is formed between Cristina point, Enrique islets, and Fernanda point. From its circular form and the nature of its shores, the bay is evidently the crater of an extinct volcano. The shores are composed of steep rocky cliffs from 100 to 200 feet high, and the ascent to the plain on their summits, on which the town stands, is made by staircases in various parts of the cove.

As a harbor, Clarence cove is perfectly safe (even from tornadoes, as a rule), and affords good anchorage in from 9 to 12 fathoms, mud; while the smooth water, and rise of 7 feet, admit of vessels being beached for repairs without danger; but the high cliffs, by excluding the breeze, render the anchorage hot and unhealthy. The town, which is very small, stands on a plateau on the south side of the port; it principally consists of a few good houses belonging to merchants connected with the trade in the oil rivers. A wooden pier 70 feet long and 4 feet above high water is situated beneath the Governor's house in the depth of the bay. The inhabitants consist principally of liberated Africans. They cultivate fruit and vegetables, and raise goats, pigs, and poultry; these with yams form the principal supplies of the island. A Spanish guard ship with a detachment of marines is stationed in Santa Isabel.

Water.—A spring of fresh water rushes over the rocks at the base of the cliffs which form the south side of the cove, and around it a wooden house has been erected, and near it is a Jacob's ladder leading to the plateau above. From this spring ships obtain fresh water, the best time being after half ebb. The water, however, sometimes fails, when it must be obtained from Nervion bay.

Tides.—It is high water, full and change, at Sta. Isabel bay, at 4h.;

rise of tide, 7 feet. Along the northern shore of the island the general trend of the tidal stream is eastward, with a variable velocity, but it often runs at the rate of 1½ miles an hour. It should be particularly guarded against when approaching Sta. Isabel bay at night.

Directions.—There is frequently a difficulty in identifying the land about Sta. Isabel bay from the offing, in consequence of the shore being masked by the high land around, and this is particularly the case with Adelaide islets. The entrance to the cove lies between Fernanda point and Adelaide islets, but the actual channel is narrowed by shoals on both sides to ¼ mile. Having recognized Fernanda point and Adelaide islets from seaward, steer for Fernanda point until the buoy off the spit can be seen; this may be passed close to, but should it be gone or out of position, the lamp-post on the pier at the bottom of the bay bearing S. 54° E. (S. 39° E. mag.) will lead into the cove, where anchor as most convenient.

It would not be prudent to attempt entering the cove at night unless the lights on pier and cliffs are shown; these lights in line S. 54° E. (S. 39° E. mag.) lead in. The best anchorage outside is in about 20 fathoms, with Fernanda Point light bearing S. 72° E. (S. 57° E. mag.). The wind will almost always admit of a vessel entering, and the best time for leaving is after dark, when the wind is mostly from southward. The passage inside Adelaide islets has been recommended, especially when many vessels are at anchor in the cove, as it enables the seamen to select a suitable berth, but it is scarcely available for large vessels.

Nervion, or Goderich, bay.—Eastward of Fernanda point the land falls back into a shallow bay, the eastern boundary of which, Bottlenose point, lies nearly a mile E. by S. of Fernanda point. The coast line of Goderich bay is broken up into a series of indentations, the principal of which is Horton cove.

Consul river, or Hay brook, is a small serpentine stream which flows through a valley on the eastern side of Clarence plateau and falls into the sea in the depth of a small bight on the western side of Nervion bay.

Horton cove lies eastward of Hay brook, being separated by Goderich, or Amirante, point, which is low and rounded. The cove has a sandy beach, and into its depth flows Horton, or Nicolas, brook, a small stream similar in character to Hay brook. A quarter of a mile from the entrance, on the left bank of the brook, is a waterfall 50 feet high. At the entrance of the cove there is said to be a depth of 3 fathoms, diminishing towards the shore.

Bottlenose point.—Between Horton cove and Bottlenose point are several other small indentations unnecessary to describe in detail. Bottlenose point is remarkable by having a large tree on its extremity.

The coast.—From Fernanda point, cape Horatio is distant to the eastward 8½ miles, and throughout the whole of this distance the shore is

rocky and indented at intervals by numerous small coves. The coast is well wooded and without any known offlying dangers; it is also steep close-to, and within a mile of the shore there are depths of 26 and 28 fathoms. Vessels sometimes anchor along shore about 3 or 4 miles eastward of Fernanda point, but towards cape Horatio the water becomes deeper, and tornadoes blow heavily along the coast, though not long enough for much sea to get up.

Cape Horatio, the northeastern point of Fernando Po, is a round, sloping, wooded point, with hills rising close behind it. It is rocky at its base and steep-to, with some rocks close in shore.

Horatio island lies a short distance off cape Horatio, and shows distinctly as an island when rounding the cape at about 2 miles distance.

Caution.—There are no offlying dangers at cape Horatio, but at night vessels should be careful in passing either this point or cape Bullen, for the water is too deep for the lead to be any guide, and the high land is very deceptive.

The coast.—From cape Horatio the coast takes a general southerly trend for a distance of 7 miles, and thence continues almost in a straight line to the SSW. as far as cape Barrow, the south point of the island. The whole extent of this coast line is abrupt and greatly indented, forming a succession of points and coves, fringed with rocks close in shore.

Leven island, of small extent and moderate elevation, is only a short ½ mile from the shore of Fernando Po, with which it is confounded when viewed from eastward. A depth of 20 fathoms will be found within a mile of the island.

Melville bay.—Southward of Leven island is a bay studded with rocks and small islets; and 3 miles further south is Melville bay, which is about 3 miles across by 1½ miles deep. The bay is quite exposed to easterly winds, which blow with great violence during the tornado season, and the bank of soundings is very narrow off this part of the coast. This side of the island is but little frequented, in consequence of the anchorage being bad, and thus a ship caught in a tornado, without a place of refuge and unable to run, would be placed in a position of great danger.

Cape Barrow, the extreme southern point of Fernando Po, is a high rocky point, surmounted by a hill 1,432 feet high, about 2 miles in the interior (Burn peak), and like the rest of the island is very wooded above the cliffs which form the shore; around its base are some rocks and breakers.

The coast.—From cape Barrow to cape Badgley, the southwestern extremity of the island, the distance is 21 miles in a WNW. direction, the character of the coast being the same as that already described. This part of the island is also little frequented, as the shallow indentations offer no shelter from the winds ranging between SE. and SW., which sometimes create a heavy sea. Along this shore the land rises very rapidly,

and two peaks of about 1,348 feet high (Saddle hills) overlook the central portion of the coast.

Cape Badgley is high, bluff, and wooded, with deep water close-to; and from it the western shore of the island trends nearly at right angles to the southern coast.

San Carlos, or George, bay.—At the distance of 8½ miles NE. by N. of cape Badgley is the rounded point of San Carlos, or Charles Folly, the southwestern point of San Carlos bay. The bay is a deep indentation about 6 miles across between the above point and Cabras (Kelly point) to the NE. The south shore of the bay, of moderate height, and much indented, takes an easterly trend for about 5 miles, and thence sweeps round with a low, wooded, sandy shore to Cabras point.

Marwood river.—The sandy shore is fringed here and there by reefs, and numerous streams flow through it in various places, whence pure fresh water may be procured; the principal of these streams is known as Marwood river, about 2 miles southward of Cabras point.

Cabras point is rocky, steep-to, and rises gently to a hill of moderate elevation, at the distance of 1½ miles inland.

Anchorage.—San Carlos bay as an anchorage is preferred to Santa Isabel bay, as it is commodious and can be entered with facility; it is also without offlying dangers, and is well sheltered from all the prevailing winds, excepting the squalls from the high lands. The best anchorage is in from 16 to 20 fathoms, with Cabras (Goat) island touching Cabras point, and Clarence peak about N. 63° E. (N. 78° E. mag.). Small vessels can go nearer in, south of the watering place.

Supplies.—Ships anchoring in San Carlos bay generally fire one or two guns as a signal to the natives, who, in exchange for muskets, knives, and any sort of iron, bring off goats, pigs, poultry, and yams. The bay is a good place to haul the seine, as mullet, bream, and other kinds of fish, as well as turtle, are plentiful.

Water.—Marwood river watering place, where a plentiful supply of spring water can be obtained, is convenient, and firewood abundant.

Tides.—It is high water, full and change, in San Carlos bay at 4h.; rise of tide, 7 feet.

Directions.—Vessels from the westward, bound to San Carlos bay, should endeavor to make the SW. end of the island, on account of a strong NE. current and baffling winds. A ship, if once to leeward, would find it difficult to recover lost ground. When the island of Fernando Po is first made two peaks are seen, the northern and highest being Clarence peak, with its sharp summit, and the southern, with a rounded summit, sloping gradually to the sea. A third peak, quite high, is seen near the southern one, if the vessel is approaching the coast farther north. To be in good position, these latter peaks should be closed in one.

Should the vessel be so far to leeward as to have Clarence peak bearing N. 85° E. (S. 80° E. mag.) she should tack, and close San Carlos point, and then keeping an offing of one or 2 miles, run along the south shore, and anchor as before described.

Cabras (Goat) and Kid islands.—At the distance of 1½ miles north of Cabras point is Cabras island, about ¼ mile in extent, and of a moderate height. About ⅓ mile in shore is Kid island, smaller in size; and still further in, about the same distance from Kid island, is a low rock, surrounded with breakers. The coast abreast these islands falls back into a bay, with a sandy beach, broken here and there by rocks. Goat and Kid islands afford convenient shelter, and anchorage may be obtained on their SE. side about ⅓ mile off.

The coast.—From Cabras point the coast is almost exclusively composed of rocky cliffs, with numerous indentations as far as cape Bullen; none of these have been surveyed, but the largest is just within Boteler point, which is distant from cape Bullen 10 miles in a southwesterly direction.

Boteler rocks.—The only known detached danger off this part of the coast is a reef, on which two rocks appear, known as Boteler rocks; this danger lies 1½ miles off shore with 14 to 20 fathoms between, 3½ miles from Boteler point, and 5 miles from Cabras island. This danger is ⅔ mile in length N. by E. and S. by W., but very narrow, and is steep-to all round.

Seasons and winds.—The seasons and climate at Fernando Po are generally the same as those experienced in the bight of Benin, with perhaps more rain, caused by the very high land. Land and sea breezes prevail throughout the greater part of the year; the tornadoes, which are frequent and heavy, blow generally from the eastward, but they have been known to blow from NNW., when the anchorage in Maidstone and San Carlos bays would be on a lee shore. Unfortunately, the island is very unhealthy, especially during the rainy season, which commences about the latter end of May or beginning of June, and terminates about the middle or end of November.

The best months are those in which the harmattan prevails, when, the rainy season being over, the atmosphere is cleared of the miasma engendered by humidity. It blows principally during December, January, and February, but is not continuous, nor does it blow with much force. It is replaced after the last named month by breezes from SW. to WSW., which lessen the burning heat and oppressive dryness experienced during the continuance of the harmattan.

Haze.—The weather is often so thick and hazy that the island can not be seen, and, as the easterly current is strong, vessels might run past the

island. Approaching from cape Formoso, therefore, under these circumstances, the frequent use of the deep-sea lead is absolutely necessary.

Currents.—The currents around Fernando Po are very variable, and require closer observation. The Guinea current, which is so continuous and rapid towards the bight of Biafra, impinges on the shores of Fernando Po, and the island is therefore to a certain extent within its influence; nevertheless, it might be affirmed that generally along the western coast the current sets about NE. with a rate of one to 1½ miles an hour; while along the north coast it runs to the east and ENE. with an equal velocity. Along the eastern side of the island close in shore, the direction is NNE. and NE., but in the offing it sets toward north, and, as the distance from the shore is increased, to NNW. and NW. However, they are variable in this locality, and therefore can not be depended on; the rate is generally 1½ miles an hour.

Soundings.—The greatest depth is near cape Bullen, on whose meridian, at 2 miles distant, there is found 48 fathoms, mud bottom. The depths then diminish proportionally to the northward in approaching the mainland. On the east coast of Fernando Po the plateau of soundings extends from the island to the continent, as far south as the parallel of Clarence peak. To the southward of this parallel the edge of the plateau has the same trend as the shore of the island, and only 2 or 3 miles from it; beyond this distance there is no bottom at 100 fathoms. The bank of soundings has not been surveyed or examined in this part nor on the south shore, which appears steep-to. On the west coast great depths are found at a short distance from the land, and the edge of the bank appears to be about 3 miles off shore, as far as the parallel of Boteler rock; to the northward of these rocks is the general plateau, prolonging the continent. The soundings here vary between 47 and 53 fathoms at 2 miles from the island.

Princes Island.

Princes island lies 120 miles from cape St. John, the nearest part of the coast of Africa, and 116 miles SSW. of Fernando Po; and in its physical features it is no less remarkable. The island lies between the parallel of 1° 41′ 30″ and 1° 32′ N., and the meridians of 7° 20′ and 7° 27′ 30″ E. It is 9½ miles long north and south with an average breadth of 4½ miles. It was discovered by João de Santarem and Pero de Escabar, two Portuguese nobles, on St. Anthony's day, 1471, and by them named San Antonio. The name of Ilha do Principe, or Princes island, was conferred on it about the year 1500, when its revenues were granted to the heir of the crown of Portugal.

Princes island resembles Fernando Po in its general aspect, but is more picturesque, with its needle-shaped peaks and adjacent mountain masses,

which rise abruptly from the high land of the interior. The island is unhealthy, owing to the abundance of rain, which causes rank vegetation. The soil in many places is of a fertile black earth, mixed with gravel, and a little sand; in others, of very fine and excessively compact clay. In parts there are traces of extinct volcanoes, and large spaces are covered with volcanic stones, which serve for building purposes. The northern part of the island, though high, presents only hills, between which flow many streams; the southern portion consists of steep and rugged mountains, surrounded by immense obelisks of fantastic forms, the whole culminating in a peak 3,050 feet above the sea, which may be seen in clear weather a distance of 60 miles. Near the center of the island, on an elevated chain of mountains, is the remarkable horn-shaped peak Papagaio. Beyond, another short chain runs SE. and NW.; Padrim peak in the NW., and Serras dos Picos in the SE.; on the SE. side of the island are the two Mamelles or Paps, and on ponta das Agulhas the Focinho de Cão hill. All these mountains are covered with a dense growth of trees, and give rise to more than 300 streams.

Soundings.—The bank of soundings to the northward as well as to the eastward runs off about 3 miles, with irregular depths, but to the SW. it extends upward of 12 miles, including near its southern limit the two islets of Great and Little Brothers. On the west side it appears to extend about 5 or 6 miles, but has not been sufficiently examined.

Products.—The water here is excellent, and easily obtainable in any quantity. Fire-wood is also plentiful. Beef may be obtained at San Antonio and West bay, and occasionally pigs and poultry, but not in large quantities. Fruits and vegetables of all kinds are grown, but yams and sweet potatoes are scarce; in the forests are many valuable and useful woods.

Climate.—The climate, like that of the Gaboon river, is very hot and humid, but not so much so as on the continent, for the temperature is sensibly diminished by the sea breezes. There are but two seasons, that of the tornadoes from March to September, the pleasantest part of the year; and the rainy season from the end of September to March, during which period also violent storms are of frequent occurrence. The dry months are July and August, which is also the period of the SW. breezes.

Population.—Nearly the whole of the population reside in the town of San Antonio, situated in the depth of a bay on the east side of the island, for scarcely any other place merits the name of a village; and thus with only one town, the island has no internal trade, neither are there any practicable roads beyond the high peak and that of Papagaio, and up to these they are rather tracks than paths.

In 1878, the total population of Princes and San Thomé islands numbered 20,931, the former in 1855 being about 4,000.

The men of the better class are well educated, courteous, and hospitable, speaking and writing Portuguese; and some of them are acquainted with other European languages. The lower orders are rude, superstitious, and indolent.

Ponta Flora is the NW. point of Princes island, formed of steep cliffs, with a few offlying rocks. It is steep-to, and at a short distance is found 10 to 12 fathoms. On the summit of the hills above the cliffs, near ponta Flora are a few houses in the midst of surrounding verdure.

Bombom island is the extreme northern point of Princes island, being connected with the mainland by a sandy spit; two small rocks lie to the westward. The so-called island is elevated, wooded, of a rounded form, and steep-to on its seaward face, against which the sea frequently breaks.

Pedra da Gallé lies N. 22° W. (N. 6° W. mag.) of ponta Flora, about 2 miles distant; it is a bare black rock of basaltic formation, and only 9 feet high, very dangerous at night, though the sea always breaks over it.

The depths in the passage between the rock and Princes island vary from 10 to 17 fathoms, and the channel is free from any known danger. The general character of the bottom is sandy, sometimes mixed with rock. The white spots on Pedra da Gallé are made by the guano of sea birds. Two-thirds of a mile northward of this rock there is no bottom at 100 fathoms.

Fish are abundant in its neighborhood.

Burras point.—From Bombom island to Burras point, about 2 miles eastward, the land falls back into an irregular-shaped bay, well wooded close to the shore, which is composed principally of rock, with here and there small sandy bights. The bay offers good anchorage in 9 fathoms, mud bottom.

Burras point is high, rocky, and steep, with breakers at its extremity. The point in shore is lower, and seen from a distance looks like an island. On the hills along the shore within the point are a few native huts, partly hidden by foliage, and immediately to the eastward of the point is a small sandy bay.

Mosteiro islet.—From Burras point the shore trends ESE. 1½ miles to Mosteiro point, the NE. extremity of the island, formed of cliffs, over which the sea often breaks heavily. Close to Mosteiro point is a black rock known as Santa Anna islet, and NE. nearly ½ mile is a group of bare rocks, connected by a shoal bank with the island. The largest of these rocks is Mosteiro islet, elevated about 29 or 30 feet, with 4½ to 5 fathoms water around it. A sunken rock, with 2 fathoms of water, on which the sea breaks, will be found about midway between Mosteiro islet and the northern end of Santa Anna islet.

Diamond rocks.—About 200 yards outside Mosteiro islet are the Diamond rocks, consisting of a small, low rock, above water, fringed by several sunken

rocks, on which the sea breaks heavily. These rocks should not be rounded on their eastern side nearer than ⅓ mile, where the depth will be about 30 fathoms, and when they bear S. 16° E. (south mag.) care must be taken to avoid the current which sometimes sets strongly toward them. The rock is in latitude 1° 40′ 42″ N., longitude 7° 27′ 56″ E.

Cabras bay.—Between Mosteiro point and Capitain point, distant 1,300 yards to the southward, the shore is rocky and fringed with breakers, falling back into Cabras bay, which is shallow and rocky.

San Antonio bay, the most important in Princes island, is comprised between Capitain point and Garça point, which is $2\frac{7}{10}$ miles southward of the former point. Between these, the bay recedes westward 2½ miles and forms a number of small coves, with an interior bay, at whose extreme depth stands the town of San Antonio. It can not be seen from seaward unless approaching from the northward. The shores of the bay are rocky, with numerous sandy coves.

San Antonio bay is exposed to east and SE. winds, from which quarters the tornadoes blow, but the holding ground is good.

Captain point, formed of moderate cliffs, is a narrow tongue of land, and not only forms the north point of San Antonio bay, but the eastern point of a small bay known as Praia Formiga, which is ¾ mile broad and ½ mile deep, with a sandy beach, through the western part of which runs a small stream. This bay is limited by Santa Anna point, high and wooded, terminating in low cliffs. The depths in the bay vary from 6 to 7 fathoms, with 4 fathoms close to the beach, where the sea often breaks heavily. As the bottom is composed of coral and shell, and the bay open to the SE., it would be imprudent to anchor during the tornado season.

Roques island.—Abreast of Santa Anna point, 200 yards distant, is a group of islets, the highest of which is Roques island, covered with brushwood, and 65 feet high. Between the island and Santa Anna point there is a boat passage, but the sea almost always breaks on the shore of the island and around the point, making it impossible to land. From the eastward the island is mistaken for Santa Anna point; when bearing north it is clearly detached.

Santa Anna rock.—This danger is an isolated rocky head, with only 12 feet of water on it; its reported position is 500 yards S. 33° W. (S. 49° W. mag.) from Santa Anna point, and as it is 400 yards off the nearest shore, and does not show, caution is necessary. The east end of Roques island, touching the north extremity of the sandy beach in Praia Formiga, leads a good 200 yards eastward of the assigned position of the rock.

NOTE.—The rock has been unsuccessfully searched for by three French men-of-war: *Le Prégent*, in 1873; *Le Boursaint*, in 1879; *Le Dumont d'Urville*, in 1888.

Bank.—A bank, about 100 yards in extent, with a least depth of 2½ fathoms and 4 to 5 fathoms around, lies in the anchorage of the bay with fort da Mina, on ponta Demonio, about south and distant 700 yards.

Anchorage.—There is anchorage in from 6 to 7 fathoms, good holding ground with the fort bearing S. 40° W. (S. 56° W. mag.), distant 1,200 yards (about 300 yards outside the reported position of Santa Anna rock), and for small vessels within the 2½ fathom bank, above referred to, in about 4 fathoms, mud.

Northern shore.—From Santa Anna point, the north shore of the bay trends westward, and for the space of ½ mile is composed of rocky cliffs, above which the land rises abruptly and is wooded. On the summit of the hill, just over the termination of the cliffs, stands Santa Anna chapel, and thence the coast as far as the town continues high and wooded, with numerous rocky points and small sandy coves between, where landing may be effected.

After passing Forte point, two large houses will be seen on the shore near the town, the first being Casa Fereira, and the other Casa Gaetano, the latter being the residence of the governor. Landing is easy on the piers abreast of the houses just alluded to, and beyond this boats should not proceed, on account of numerous rocks which stud the bottom.

San Antonio.—The town stands on a low marshy plain between the Frades river to the NW. and Papagaio river to the SE. and is sometimes inundated by the sea. It is sheltered by the high wooded hills, and is so damp as to necessitate building the houses on piles, the lower or basement story being assigned to domestic animals. The town is tolerably regular, but the houses constructed of wood are often in state of ruinous decay and have a wretched appearance. The salubrity of the place may be judged of by its position, in a hot and humid climate. A detachment of native troops is stationed here.

Supplies.—Provisions not procurable, although oxen, sheep, pigs, etc., and vegetables, might possibly be obtained by giving sufficient notice to the neighboring estates.

Water.—From the Papagaio river the south shore of Santa Anna bay takes an easterly trend, and presents the same appearance as the northern side. About ⅓ mile from the town is a running stream of good water, and near it on a point eastward is a large house named San João while another stream, admirably adapted for watering, lies a short ½ mile further on. In the dry season, these streams are not accessible from the sea, in consequence of the sandy beach being higher than the stream level; and as a rule, in order to obtain pure water, it is best to obtain supplies when the tide is low.

Mails.—There is mail communication with Lisbon once a month by the line of steamers going to Loanda.

Ponta Demonio.—From the eastern of the two watering places the coast trends northward, and forms the high salient feature of ponta Demonio, which is surrounded by rocks to the extent of 200 yards. On the summit of the point stands fort da Mina, mounting 10 or 12 guns; on its flagstaff the Portuguese colōrs are hoisted, and as the walls are whitewashed it is easily recognized.

Demonio rock, with 2½ fathoms water lies 700 yards eastward of fort da Mina, and has from 3½ to 4½ fathoms around it.

Pequena bay.—From ponta Demonio the shore trends southeastward as far as Risco point; the shore between is high and wooded, with a sandy beach broken by three rocky points, with numerous small rivulets, which are all nearly dry during the rainy season. Pequena point terminates in a rocky cliff, and off it extends a reef. It is the west point of the bay of the same name, which affords good anchorage, and is protected from all winds; the bay is ¼ mile broad and 300 yards deep, with a sandy beach, near the middle of which is a large house, with a small stream of pure fresh water.

Risco point, the eastern point of Pequena bay, is rocky and steep; the land within it rises to a small conical hill, which is well wooded. Off the point are some projecting and covered rocks and care should be taken to avoid them, for though they sometimes break, they are frequently not to be distinguished.

Salgada bay.—From Risco point the coast trends eastward for 700 yards to Martha point, which is moderately steep-to; and thence continuing rocky, high, and wooded, falls back into Salgada bay about 600 yards broad, and the same in depth. The shores of the bay, which is bounded eastward by Bado point, consists of two sandy beaches, separated by a rocky cliff. Close to the beaches at each angle of the bay is a large house, and a chapel surrounded by huts.

Garça point.—From Bado point the coast takes a general trend southward for ½ mile to Garça point, a rounded, rocky headland forming the south point of San Antonio bay; about midway between the above points is Anzol point, off which a rocky spur extends for the distance of 200 yards.

Tides.—It is high water, full and change, in San Antonio bay at 3h. 58m.; springs rise 3 feet, neaps 1½ feet. The rise and fall are very regular, but the tidal stream, which does not attain any great velocity either during flood or ebb, is not so regular.

Directions.—When approaching Princes island, it is generally considered advisable to do so from the southward, to avoid being set to leeward by the currents, which almost invariably, in the vicinity of the island, set north and NNE. from one to 1½ miles an hour. This precaution is especially necessary if making for West bay, but if bound for San Antonio bay,

although the southern route is preferable, a vessel may pass either north or south of the island, for the anchorage can always be reached even from the northward without difficulty.

At the distance of about 20 miles westward of the island, a large number of sea mews and other aquatic birds are generally fallen in with, and this fact may prove useful during hazy weather, or at night time, for the birds, on being disturbed from their rest on the surface of the water by the progress of the ship, rise and give utterence to plaintive cries.

If intending to round the north end of the island, Pedra de Gallé may be passed on either side, but when on the meridian of Burras point, calms are often experienced, and advantage must be taken of occasional squalls to reach the meridian of the Diamond rocks, where the usual breeze from south to SW. may be expected; and after a good board to the southeastward, stand in for the bay, which is, however, often rendered difficult of access on account of calms and squalls.

When rounding the island to the southward, avoid if possible passing between Piconegro point and Carocha island, where the winds are baffling, and currents variable; but stand on well to the eastward until past the meridian of Garça point before bearing up to the northward in order to avoid being becalmed too close to the shore. When off the bay, in case of calms, it may be necessary to anchor to avoid being set to the northward. As the winds in the vicinity of the bay are generally between south and west, a vessel must beat in, and in doing so it is necessary to keep on the southern shore, as both swell and current set to the northward.

Broad bay.—From Garça point the coast falls back into a bay, terminating to the southward in ponta da Mai, which is distant from the former 4½ miles SSW. Ponta da Mai is bold and steep-to, but about ⅜ mile NNE. a cluster of rocks extends ½ mile off shore. Between the points forming Broad bay the coast is composed of high rocky cliffs, many of which show red patches. A little to the northward of ponta da Mai begin the mountain ranges which cross the island; their fall to the southward is very sudden and the land rises abruptly from the borders of the sea. In standing along the east coast of the island, vessels should avoid entering this bay on account of meeting calms, violent squalls, irregular currents, and oftentimes a heavy swell.

Praia Grande.—To the southwestward of ponta da Mai is a small bay with sandy beach, known as Praia Grande, ⅓ mile broad. Beyond this the coast is high and rugged as far as Piconegro point, the extreme south point of the island, which is a tongue of land with abrupt cliffs on all sides. A sunken rock, which usually breaks, lies off its extremity.

Carocha island.—At the distance of 1½ miles SE. of Piconegro point is a steep rocky island, about ½ mile in length, and about 1,037 feet high, covered with trees and brushwood. The island from its peculiar form is

known as Carocha island (Dutchmans cap). Seen from the southward, it makes like a part of Princes island; it is very steep-to, and in the channel between, which is clear of danger, the depths are from 25 to 30 fathoms, fine black sand.

Southward of the island is a low rock which shows out in a detached form when seen from east or west.

South coast.—From Piconegro point, the south coast of Princes island, as far as ponta do Groso, a distance of 3 miles, forms three bays, separated by rocky points; the shores of the bays are very high, rocky, and wooded, and are commanded by high peaks of the southern chain of mountains. The first point NW. of Piconegro point is that of Portinho, off which is a rocky islet of the same name, around which the sea breaks heavily.

These bays afford no shelter, and the sea usually breaks along the shore; in the westernmost bay, within ponta do Groso, is a large stream of water.

Ponta do Groso, at the SW. extremity of the island, is a high rocky headland formed by a hill named Barriga Branca, which when viewed from the SE. shows two conical peaks; the point is steep-to, and ¾ mile off shore, there is a depth of 15 fathoms, mud.

West bay.—From ponta do Groso, the coast trends NW., 1¾ miles, to the western point of the island, marked by a small conical peak, and thence north one mile to ponta da Formiga, the south point of a small sandy bay, which does not, however, afford any shelter.

The sea breaks along this part of the coast, and vessels should not range too near without a favorable breeze for clearing again, on account of the currents and swell setting toward the land. For the same reason vessels should avoid approaching near the southern shore of the island.

A little further north is the salient ponta das Agulhas, the SW. extremity of West bay, or bahia das Agulhas, the safest and best in the island, being sheltered during the tornado season from SE. and SW. winds. The point is surmounted by a peak ¾ mile to the SE., when the land slopes gently to the shore, and terminates in a small rocky islet, about 400 yards distant.

West bay is comprised between the ponta das Agulhas and Pedrinha point, to the NE., a distance of 3 miles, and from this line the bay falls back 1⅓ miles. When seen from the westward the appearance of the bay is remarkable, for in the foreground there are five apparent points, which make like five conical islets, as the lowland which unites them is not seen from the offing, while in the background are the great elevations of Carriote, Papagaio, and the Pico, and to the right the equally abrupt hill, called the peak of Agulhas, already mentioned. Seen from the westward it certainly deserves its name of bay of Agulhas, or Needles. It is free from dangers, and the water shallows gradually within the line joining the two points. On the meridian of the ponta das Agulhas, and on the parallel

of the center of the bay, will be found 28 fathoms, black sand, and 20 fathoms on the line joining the points. Anchorage can be taken just inside of this line in 16 fathoms, sandy mud.

The high lands attract rain, and it frequently happens that here, as well as at San Antonio bay, it rains heavily and for a long time on the land, without a drop falling on the shipping afloat. Supplies were formerly obtained here even cheaper than at San Antonio; but in 1865 the only inhabitants consisted of a few wretched negroes, and in 1874 no supplies of any kind could be obtained here.

Water.—The land in the depth of the bay is low, formed by hills, separated by valleys, through which flow numerous streams, supplying excellent water. One of the best watering places is about one mile from the northern part of ponta das Agulhas.

Shoal.—A rocky shoal, with 1½ and 2 fathoms water, extends off 500 yards from the southern shore of the bay, about ¾ mile eastward of the ponta das Agulhas, and this danger should be carefully avoided by vessels wishing to obtain an in shore berth for watering.

Tides.—It is high water, full and change, in West bay at 3h. 37m.; springs rise 5¾ feet.

Directions.—The prevailing wind from SW. will enable a vessel to haul round ponta das Agulhas and choose a berth, but in rounding the point from the southward care must be taken to avoid a small detached rock, which sometimes covers, about 300 yards from the shore and 800 yards N. 34° E. (N. 50° E. mag.) of Pedra das Agulhas. Good anchorage for a large vessel may be obtained in about 12 fathoms, with the ponta das Agulhas bearing west (N. 74° W. mag.). Storms are frequent, and occasionally the wind is NW., when it is necessary to look to the moorings, but generally there is no danger. Tornadoes blow from the east, and with greater fury from coming over the high land; and if at single anchor, care should be taken not to foul it, as the vessel swings from riding to the SW. breeze. Leaving West bay for San Antonio, vessels start at high water, or the first of the ebb, and proceed south of the island.

Pedrinha point is a steep rocky point at the NW. termination of the central chain of mountains, and about 200 yards SW. is the small rocky islet of Pedrim, about 150 yards off shore. North of the point is a small sandy bay, through whose northern boundary an arch has been formed by the sea; hence its name, ponta Furado (pierced point). Beyond this, the coast continuing rocky, forms another indentation, terminating in ponta do Broa Pequena, distant 1⅛ miles north of ponta Furado. The coast is clear, with from 9 to 12 fathoms close to the shore.

Mai Marth bay.—About ¾ mile north from the preceding is ponta da Mai Marth, the western boundary of a bay of the same name, of which ponta Flora, distant 1½ miles NE. by E., is the eastern limit. The bay,

which is 1½ miles deep and clear of danger, is sheltered from the prevailing wind and affords good anchorage, the only drawback being that, in common with all the bays of the island, it is subjected to alternate calms and violent squalls, occasioned by the mountains. In the depth of the bay are numerous streams, and a house surround by huts. On a line joining the two points will be found a depth of 15 fathoms, and from this the soundings decrease gradually to 3 fathoms near the beach. There is ordinarily a heavy swell in the bay, due to its exposure to west winds, and sometimes a heavy surf near the beach.

The Brothers, or Pedras Tinhosas, are two conspicuous islets SSW. of Princes island. The larger islet, known as the Great Brother, is 130 feet high, and lies from ponta do Groso, the nearest point of Princes island, S. 18° W. (S. 34° W. mag.), 12¼ miles, while the Little Brother, of similar elevation, is 10½ miles S. 26° W. (S. 42° W. mag.) of the same point. Both islets are covered with brushwood and are difficult to land in consequence of the surf; they are also marked by white patches caused by the guano of sea birds. When seen from the east or west the Great Brother shows two paps; off the SW. side of the Little Brother is a detached rock.

San Thomé Island.

San Thomé island is much longer than Princes island and of greater commercial importance, but is less useful as a place of call in consequence of its want of harbors. It should not be approached by vessels which do not intend anchoring, as calms, baffling winds, and strong currents prevail in its vicinity. It belongs to the Portuguese.

The island is said to have been discovered on December 21, 1470, the day of St. Thomas; hence its name. It was not colonized until 15 years after, when its prosperity for nearly a century was most remarkable; but in 1574 a body of negroes, who had lived and increased in the brush, made an attack on the unsuspecting inhabitants, and the warfare was kept up for nearly a century before the bushmen were subdued. Since then a series of causes, culminating in the discovery and colonization of Brazil, whose vast extent and superior climate induced all the colonists of San Thomé to abandon it, have reduced the island from its once prosperous condition to a state of complete decay. The island is 25 miles long and 17 miles broad, extends from the parallels of latitude 0° 24′ 15″ N. to ⅝ mile north of the equator, and between longitude 6° 26′ and 6° 44′ E. The island is very mountainous throughout, and in its central western part attains, in pico de San Thomé, an elevation of 7,005 feet, covered with a mass of trees, and from its sides numerous streams find their way to the sea.

About 2 miles east of this peak is seen pico de Anna de Chaves, 6,913 feet above the sea, and a little to the northward is another almost as high.

From this central mass two chains diverge, one eastward in the direction of Mercia Aves bay and the other ESE., the latter range having among other peaks those of Maria Fernandez and Mocondom close to the shore. From the last-named peaks the chain trends about SW. and terminates in the sharp peaks of Cão Grande and Cão Pequeno.

The north side of the island presents an immense plain, watered by a multitude of streams, and from its center, about 3 miles from the sea, rises an undulating chain of hills, the most northern of which is Guadaloupe hill. This part of the island is adorned with luxuriant verdure, with many fine plantations of sweet cassava and calavances, as well as groves of cocoanut and plantain.

The island, when seen from the NNE. at a distance of 60 miles, presents three very remarkable mountains, viz, San Thomé, whose summit is frequently hidden by clouds; Cão Grande, with its needle-shaped peak; and Maria Fernandez peak, the top of which resembles the form of a sugar loaf.

Population.—In 1878 the population consisted of about 17,000. The people reside principally in eight villages, or towns, the principal being that of Saõ Thomé, in Anna de Chaves bay, on the NE. side of the island; but here and there some habitations are seen bordering on the shore. This being a Portuguese penal settlement, there are about 400 convicts on the island, and a regiment of black troops is also stationed here.

Produce.—The island is composed of very compact and heavy basaltic rock, covered by one of the most fertile soils imaginable, but its cultivation is neglected in consequence of want of labor. Its chief exports consists of coffee and cocoa; bullocks, pigs, goats, and fowls are plentiful and good, and may be obtained at moderate charges. Similar fruits and vegetables to those grown at Princes island may be obtained, but not in any quantity. Excellent water and plenty of wood are procurable.

Currents.—When approaching the island of San Thomé from the westward, it is advisable, in order to take advantage of the Guinea current, to keep northward of the parallel of 1° 30′ North latitude until the meridian of 6° East longitude has been attained. By doing so, the ship will avoid the Equatorial current, which is found a little distance to the westward on the above parallel and occasionally even further north. This latter current sometimes surrounds San Thomé island, and on the meridian north of the island has been found setting to the westward. Eastward of San Thomé the current generally sets northeastward.

Ponta do Figo, the NW. point of the island, is high and peaked, with steep rocky cliffs on its sea face. About 1½ miles to eastward is ponta Carregada, a low rocky point, surmounted by a small conical hillock named Morro Carregada. Between these points are two small bays, separated by

a rocky point; the westernmost of these indentations has a sandy beach, and off the points are rocks, which are partly covered at high water.

Ponta d'Agoa Ambo, lies 1½ miles from ponta Carregada, the shore between being broken and fringed with rocks, which cover at high water. From the former point, the coast takes a southeasterly trend for a distance of 1½ miles to ponta do Peixe, a rocky projecting point, surmounted by a hillock, on which stands the ruins of a chapel dedicated to San Francisco. It forms a good mark for the anchorage in Man of war road.

Ilha das Cabras, a short ½ mile in length, is marked by two paps, and lies 1½ miles eastward of ponta do Peixe. It is of moderate height and may be seen from 16 to 18 miles off. The island is connected with the main shore of San Thomé by a bank whose 3-fathom boundary is ½ mile distant in an east and north direction from Cabras, and from the latter point the edge of the bank extends with an irregular outline westward for 3 miles, and joins ponta d'Agoa Ambo.

From the NE. extremity of the bank, off ilha das Cabras, the 3-fathom line trends almost in a direct line for ponta San Sebastian, which it approaches within 200 yards. This plateau is known as the bank of Santa Anna.

Man of war road.—This anchorage, about one mile off the north side of San Thomé island, extends between ponta d'Agoa Ambo and ponta do Peixe. By reference to the plan and the exercise of common precaution, the anchorage is easily accessible; but it can only be deemed safe when compared with other places on the eastern coast, and is preferable to the anchorage off Anna de Chaves bay during the tornado season, as the winds which blow directly into the latter bay, lead clear out to sea from the former anchorage.

Anchorage.—The marks for the best anchorage for a large vessel in Man of war road are, the middle of ilha das Cabras, S. 68° E. (S. 52° E. mag.), the ruined chapel of San Francisco, S. 26° E. (S. 10° E. mag.), and Fernandilla farmhouse (a conspicuous stone building close to the landing place), S. 11° W. (S. 27° W. mag.). Here will be found about 7 fathoms over a sandy bottom. The anchorage should, if possible, be made from the eastward, as the winds and currents are baffling when passing the north end of the island from the westward.

The northern shore of San Thomé presents a pleasing aspect, as does also the eastern side. The hills are covered with a rich verdure, and fine groups of trees are scattered over the plains.

NOTE.—A letter should be sent to the Governor announcing arrival, as permission must be obtained to anchor in Man of war anchorage.

Supplies.—Water of a good description can be obtained from a small rapid stream, which flows into the sea about ¼ mile eastward of Fernandilla house, but as there is a surf on the bar, it is advisable to land a little west

of the river. The river runs though a beautifully sheltered valley, where a ship's company might be landed for recreation with great advantage to their health. The water is not only much better than that in Anne de Chaves bay, where the women are constantly washing with palm oil soap, but is more easily obtained.

Wood is also plentiful, and goats, poultry, fruit, and some vegetables may also be procured, in exchange for which tobacco, spirits, old clothes, and glass beads are received.

Light.—A light is exhibited from a lighthouse on the eastern summit of ilha das Cabras. The light is a flashing white light every 2 minutes. It illuminates the entire horizon, and in clear weather should be visible from a distance of 18 miles. It is shown at an elevation of 312 feet above the sea from a lighthouse 25 feet high.

Praia Lagarto.—From ponta do Peixe, or Fernao Dias, the coast trends SE. 2¼ miles to Lagarto point, low and salient, the shore between being broken into sandy bays, separated by rocky points. Southward of the point is the bay of the same name, which is one mile broad and ½ mile deep, and only frequented by small vessels.

Anna de Chaves bay lies between the rounded Saõ José point to the north, on which are the ruins of the old fort of Saõ José, and ponta San Sebastian, a low point with a fort which bears from the former S. 51° E. (S. 35° E. mag.), 1 1/10 miles; the bay between these points falling back ¾ mile, with depths varying from one to 2½ fathoms water. The bay is said to be filling up.

Both the points of the bay are rocky, but the bottom of the indentation consists of a sandy beach on which stands the chief town of the island, known as Cidade de Saõ Thomè, which is almost entirely built of wood, and of greater extent than it appears from the anchorage.

The bay is perfectly free from danger, and although open to east and NE. winds, it offers to small vessels a safe and commodious anchorage; but those drawing over 10 feet water are compelled to remain outside the line between the points, where, however, the holding ground is excellent.

Cidade de Saõ Thomé.—This so-called city is the capital of the island, and extends in the form of an arc for a distance of 1½ miles along the shore at the bottom of Anna de Chaves bay. The appearance of the town from seaward is pleasing and picturesque, as the tiled wooden houses, numbering about 900, are interpersed among the trees. The streets are broad, and well laid out, and the houses generally are tolerably built.

There are several churches built of stone; among others the cathedral, la Conceiçao, and la Misericordia; there is also a civil prison, a town hall, and a customhouse; the last named being a large building, in front of which is a wooden pier.

A large hospital has been built on the north point of Anna de Chaves bay. The two portions of the town are connected by an iron bridge which spans the r o de Agua Grande. It is said to have a population of 10,000.

Landing can usually be effected at the pier, but with a considerable amount of swell on, the best place is under the fort, avoiding the low water rocks. The pier is being rebuilt of stone and lengthened.

Climate.—The climate, though humid, is moderately healthy. The rainy season is from September to March. Maximum temperature, 80°; minimum, 54°.

Coal.—A supply of coal is obtainable.

Supplies.—There are several good shops in the city, where furniture, earthenware, edibles, wines, etc., imported from Europe and America are sold; bullocks may also be procured through the merchants.

The water of the rio de Agua Grande, near the customhouse is very good, but near the entrance it is polluted by continuous clothes washing; there is some difficulty in boats entering the river on account of its shallowness.

Observation spot.—The observation spot, S. 72° W. (S. 88° W. mag.), 200 yards from customhouse pier, is in latitude 0° 20′ 38″ N., longitude 6° 44′ 07″ E.

Mails.—There is monthly communication with Lisbon by Portuguese mail steamers.

Lights.—The fort, a prominent white object, stands near the extremity of ponta San Sebastian, and from an elevation of 35 feet above the sea is exhibited a fixed red light, which should be seen in clear weather from a distance of 8 miles.

Two lights, red and green, are shown on the pier.

Tides.—It is high water, full and change, at Anna de Chaves bay at 4h.; rise of tide, 6 feet. The tides are regular in the bay; but outside the currents are weak and irregular, and frequently set to the northward and NNE.

Banks.—In addition to the bank of Santa Anna, already alluded to, there are two other banks, all but connected and occupying a space of 2 miles NNW. and SSE. The depths on these banks vary from $2\frac{3}{4}$ to $3\frac{3}{4}$ fathoms, and the extremes are nearly equidistant from Lagarto point.

The northern portion of these banks, $\frac{1}{2}$ mile in length, is known as Pescador bank, while the larger and southern part is called the Anna de Chaves bank, which will be cleared on its southern side by bringing fort San Sebastian to bear S. 50° W. (S. 66° W. mag.). In clear weather the bottom over these banks can be plainly distinguished; rocks covered with black seaweed, separated by spaces of white sand.

Caution.—It is reasonable to suppose that other and shoaler spots may exist. The greatest care should be exercised when navigating in the vicinity.

Directions.—Vessels intending to anchor off Anna de Chaves bay should approach from well to windward, on the parallel of the central high mountains of the island, bringing fort San Sebastian, which makes like a white conspicuous house to bear S. 82° W. (N. 82° W. mag.) and when the west extreme of ilha das Cabras bears N. 33° W. (N. 17° W. mag.) run in on this bearing, and anchor when fort San Sebastian bears S. 20° W. (S. 36° W. mag.), in about 5 fathoms.

This anchorage is over a mile from the town; but the vessels may select any position adapted to their draft, always bearing in mind that the bay is said to be filling up. When approaching the anchorage from the south, give ponta do Praiao a berth of about a mile, and steer for ilha das Cabras. Vessels should not anchor until the prison (a white building close to the shore between fort San Sebastian and fort St. Jeronimo) bears southward of S. 54° W. (S. 70° W. mag.), in order to avoid fouling the telegraph cables which are landed near the prison. At the anchorage the water is generally smooth, and the wind favorable for rafting off casks; but after tornadoes, or when the swell sets in, the sea breaks right across the bay, but not dangerously or so as to prevent boats landing.

When about 10 miles off shore variable winds, with calms and squalls, are frequently experienced and retard the approach to the anchorage. During the night, when about 5 miles off shore, the land breeze is fallen in with, generally weak and variable, and care should be taken not to be set north by the currents; take advantage of the first of the sea breeze, almost always from SW. or SSW. and variable to SSE., which sets in between 10 and 11 a. m. These are the only difficulties in approaching the anchorage.

Ponta do Praiao.—From ponta San Sebastian the coast is rocky, indented, and fringed with rocks as far as ponta do Praiao, a distance of 3½ miles SSE. At the distance of a mile from fort San Sebastian, on a slight, well-wooded eminence, is the ruined fort San Jeronimo, and ¾ mile further south is a stream of fresh water. Ponta do Praiao is a salient point of moderate elevation, surrounded by rocks which cover and uncover; southward of this point the land rises rapidly, and at the distance of a mile from the point is a small conical hill.

Almaxarim and Santa Anna bays.—From ponta do Praiao, the coast trends S. by W. for nearly 4 miles to ponta das Angolares, the coast between forming two indentations, known as Almaxarim and Santa Anna bays; both are rocky, but in the former they extend far off shore; in the depth of the latter is the chapel of Santa Anna.

Ponta das Angolares is of moderate elevation, and faced with rocky cliffs towards the south; it is distinguished by a solitary palm, and by several distinct clumps of other trees.

Ilha Santa Anna is a rocky islet of moderate height, with its summit

covered with bushes. It lies ENE. one mile from ponta das Angolares, and when not shut in with the San Thomé shore, may be seen from a distance of 16 miles. Although the shores of the islet are steep-to, and the passage within ⅔ mile broad, free from danger, it is advisable to keep well outside the island, in order to be clear of the baffling winds and squalls which prevail in shore. Off this part of the coast the bank of soundings extends about 3 miles.

Angra das Angolares.—Immediately southward of ponta das Angolares is a sandy cove, ⅓ mile in extent. Its beach is intersected by three streams, of which those to the north and south are important water courses. Some houses are seen on the shore of the cove, but the place has not been surveyed.

Ponta do Morcego.—From ponta das Angolares the coast trends SW. 9 miles to ponta do Morcego, the shore between being irregular in outline, with rocky points and sandy bays, while in other places steep cliffs rise from the sea, into which at various places several mountain streams fall; but there are no signs of any habitations.

Ponta do Morcego is a sharp cliffy point, surmounted by a small conical hill; and within it, to the westward about a mile distant, is the mouth of a mountain stream. From this point to ponta Agoa, a distance of 3 miles in a SW. direction, the shore is composed of abrupt cliffs, with several rocky points enclosing sandy bays. Off the first of these points is a black rock which never covers, and off the next point are two rocks, nearly always breaking.

Ponta Agoa, or Fernando Diaz, is backed by high lands, which extend as far as ponta Aguili; this latter point is prolonged south by rocks nearly ⅓ mile, the largest called Aguili rock, is above water quite high, and of dark color.

Angra de São João.—Ponta Aguili is the NE. boundary of the circular bay, known as Angra de São João, or Praia Sanca, which is a good mile across, between Aguili rock and ponta São João, and ¾ mile deep. The shore line is largely made up of cliffs; three rivers flow into the bay, and near the beach are breaking rocks, which are alternately covered and exposed. The village of São João stands at the head of the bay. The bay is open to the SE. winds and offers no protection against tornadoes; when they prevail, anchorage should be selected well out in the offing.

Pico Cão Grande, about 3 miles north of the bay, is an excellent mark for it.

From ponta São João the coast trends SSW. 1¾ miles to ponta Preta, the shore between being rocky and fringed with rocks, and at the summit of the hills bordering on the shore is a small but richly cultivated plain.

Seven Stones, or Sete Padras, consists of a reef of rocks ½ mile in extent, the largest and highest of which are near the center, and make like

a ship under sail when seen from the north. They lie S. 11° E. (S. 5° W. mag.) 2⅔ miles from ponta Agoa, and are close to the edge of the bank of soundings. As they are steep-to, they do not form a danger by day, but should be approached with great caution at night. In the channel between them and the main land soundings are large and variable.

Pramanga bay lies between ponta Preta and ponta Pramanga, the distance across being ½ mile. The bay is rectangular in form, and nearly a mile in depth, with a stream of water at each inner angle, but as it is exposed to the SE. it is only frequented by small coasters. The western shore of the bay is foul, and the depths vary from 9 fathoms at its entrance, to 3¼ fathoms close to the sandy beach between the two streams.

Between ponta Pramanga, which is fringed with rocks, and ponta da Baleã, the southern extreme of San Thomé island, the distance is 1½ miles in a southwesterly direction, the shore being broken with occasional low-water rocks.

Ilha das Rolas.—This island, which is the largest of those surrounding San Thomé, is upwards of a mile in length, and is distant one mile from the south shore of San Thomé. It is high and covered with large trees, including cocoanut, and has at its north end a small conical hill; when seen from a distance, the island shows as two.

Landing is impracticable at its southern end, but a good landing free from surf can be made abreast of the houses which lie on the eastern part of the northern side of the island. The landing is sheltered by a reef that runs out from the western extremity of the houses for about 100 yards, curving round slightly to the eastward at its outer extremity. The sea generally breaks over it; great care should be taken by boats to clear this reef, and a safe and dry landing can be effected.

Anchorage.—Off the NE. point of the island, the 3-fathom line extends ⅓ mile from the shore; but with this exception the channel between the island and the shore of San Thomé is safe, with from 6 to 10 fathoms. Good anchorage may be had on the NW. side of the island in 4½ to 5½ fathoms, with the summit bearing S. 61° E. (S. 45° E. mag.) about ⅔ mile off shore, and here shelter is afforded from SE. winds during tornadoes. In any case the vessel will drive to seaward, but the anchorage is not recommended with southerly or SW., winds which generally create a swell.

Santa Catharina bay.—The northern point of this bay, which forms a curve about 2 miles in extent, lies north from ponta da Baleã; the bay affords good anchorage against SE. winds, but is unsafe with winds from the ordinary quarter. About the center of the bay is a small village of the same name, consisting principally of the huts of fishermen, who are compelled to obtain fresh water from the stream which flows into Pramanga bay.

The best anchorage is abreast of the village, in about 6½ fathoms, with the north cone of ilha das Rolas open of the west end of ponta da Baleã.

Santa Catharina point is high and cliffy, and at the distance of a mile west there is said to be a reef known as Balza do Flamengo, but its existence is doubtful.

Ilheo Macáco.—From Santa Catharina point the coast trends northward, and is almost entirely composed of abrupt rocky cliffs, to as far as ilheo Macáco, a large rock of moderate height, which lies close to the coast, in line with the two sharp peaks of pico Caõ Grande and pico Caõ Pequeno. The last named peak is about a mile from the shore, and two other lower hills surmount the cliffy coast.

The island is situated in the depths of the bay, between Santa Catharina and Pillar points, but the locality has not been properly surveyed. Near the island, on the northern of the only two sandy beaches of the bay, are some fishermen's huts; and between the island and Pillar point are two small rivers.

Pillar bay.—Pillar point, the south point of the bay, is a sharp wedge-shaped point, fringed with rocks, and from it the bay extends in a northerly direction, 1½ miles to ponta Gabado.

Between these points the bay forms an arc, with much rocky shore, but with a sandy beach in its depth, intersected by a small river. The bay is well sheltered from east and SE. winds, but it has not been perfectly surveyed.

Ilheos de S. Miguel and Formoso.—Off ponta Gabado are three small islets; of these the southern and largest is ilheo de S. Miguel, and the northern and next in importance, ilheo de Formoso; both these islets are covered with bushes. The latter named islet is abreast a small sandy cove, in the depth of which are some huts.

Ilheo de Souza.—From ilheo Formoso the coast, rocky and cliffy, extends, about north 2½ miles, to the depth of a large bight, whence the coast trends westward as far as a rounded point, surmounted by a hill, known as Morro de Souza, and off it is the small ilheo de Souza.

Ilheo Venangelo.—About ¾ mile further northward is the high and wedge-shaped ilheo Venangelo, close to the coast; the eastern end is high, and falls in a straight line to the westward. About 1¾ miles from this islet is ponta Furada, steep and cliffy, with an opening worked by the sea.

Ponta Diego Vas.—From ponta Furada the coast trends NNE. as far as ponta Diego Vas, a distance of 5½ miles, the intervening shore presenting occasional cliffs of moderate elevation. Ponta Diego Vas is a rounded point, fringed with rocks, on which the sea breaks, and from it the shore trends NE. 4½ miles to ponta das Neves, on which stands a small hamlet, with a stream of water on its eastern side.

Conchas bay.—From ponta das Neves the shore falls back 1½ miles to the SE., and thence to NE. to ponta do Figo, the north point of the island, the bight between being known as Conchas bay, but its possible advantages

as a place of anchorage remain unknown, in consequence of its not being surveyed.

Soundings.—All along the coast comprised between Santa Catharina point and ponta do Figo, the shores have been imperfectly examined and the limit of the bank of soundings undetermined, though there is no doubt that on the western portion of the island the deep water approaches closer to the shore than on the eastern side. It is therefore unadvisable to close this coast, especially during the calms.

ANNOBON ISLAND.

Annobon island, the smallest and most offlying of the chain of islands in the bight of Biafra, is nearly 4½ miles long NNW. and SSE., with an average breadth of 1½ miles. The island was discovered on New Year's day, 1473, and named Annobon, or Good Year's island. It lies S. 31° W (S. 48° W. mag.) 100 miles from San Thomé, with its NW. point in latitude 1° 24′ 18″ S., longitude 5° 35′ 42″ E., and rises in varied and picturesque forms to a considerable elevation in the central part of the island, forming three peaks; the most northern, pico do Fogo, of conical shape, attains an elevation of 1,350 feet above the sea. This peak, which is richly wooded to within a short distance of its summit, is flat-topped for a distance of about 10 yards, and over it the wind sweeps with great violence. Close to the foot of the peak, west, is a beautiful little lake, filling what appears to be the crater of an extinct volcano. It is nearly 2 miles in circumference, with 9 feet in its deepest part.

At two-thirds the length of the island from the north rises pico do Centro, 3,250 feet high, and a little to the southward is that of dos Sulcadōs.

The island may be seen in clear weather 40 or 45 miles, and approached with safety to the distance of one mile.

The central parts of the island are covered with orange and lime trees, and around the base next the sea is a margin of about ¼ mile in breadth covered with groves of cocoanut and plantain trees.

Population.—The island is inhabited solely by negroes, who formerly considered themselves subjects of Portugal, but the island is now claimed as a possession of Spain, although no representative resides there. The principal town is prettily situated in a grove of cocoanut trees on the margin of an open bay on the NE. side, and is said to contain about 500 inhabitants. The population of the island numbers about 3,000, the descendants, it is supposed, of a cargo of slaves shipwrecked while on their way to Brazil from the Portuguese colonies in Africa, during the sixteenth century. The natives are a harmless and inoffensive race, who obtain their subsistence chiefly from the sea; they are active and hardy, and, though now only half civilized, are capable of great improvement; many of them

speak English. They suffer much from skin disease, which may be from their want of cleanliness.

Climate.—There are two rainy seasons at Annobon, the one during April and May and the other during October and November. Although differences of opinion exist respecting the salubrity of the island, there seems to be no doubt that it is far healthier than the other islands in the bight of Biafra, and this fact may be attributed to the following causes, viz., its distance from the African shore, being always surrounded by the comparatively cold waters of the Equatorial current; to the absence of miasmatic vapors and excessive rains, which are so prevalent on the coast and islands near it; and, lastly, to the absence of marshy land and stagnant waters.

Supplies.—Annobon is rarely visited save by ships in want of provisions. The island produces plenty of wood, and is well supplied with good water, which flows into the sea a short distance SE. of the anchorage; ships may be supplied by means of their ownboats or by native canoes.

Pigs and fowls may be procured, as well as fruit, yams, and sweet potatoes. The orange, however, is essentially the fruit of the island; they grow in large quantities, are full of juice, and have an exquisite flavor; they are generally ripe in July, August, and September.

It should be borne in mind that no money is required to obtain supplies of refreshments as the natives prefer being paid in kind, and readily take in exchange old clothes of all descriptions, handkerchiefs, hats, caps, hardware, gunpowder, spirits, tobacco, pipes, and salt. Though no duty is claimed for anchorage and water, it is customary to make a present of a few of the above articles to the native governor as a recognition of his authority, and these may be considered as port dues; it is also usual to make a present to the priest, who ranks next the governor, and to the man who acts as interpreter.

San Antonio.—Esteves point, the NW. extremity of Annobon, is formed of steep rocky cliffs, which extend as far as ponta do Ilheo (which is low, with a small rocky islet close to it) ⅔ mile northeastward, whence a sandy shore commences, and continues to Antonio point, the north end of the island. From this to Pyramid point, ¼ mile to the SE., the beach is still sandy, and between them stands the village of San Antonio, the largest in the island, but the houses are small, miserable hovels, rudely constructed of rough hewn planks and of mud. The chief of this town is recognized as the governor of the whole island.

Pyramid point is low, sandy, and rendered remarkable by a number of black rocks off it, the most conspicuous being a pyramidal-shaped rock, which gives its name to the point. This rock is prolonged by a chain of rocks about 330 yards N. 35° W. (N. 18° W. mag.), forming a natural jetty. From Pyramid point the coast trends ESE. ½ mile to ponta

Pedrinha, formed throughout of cliffs fringed with rocks, some above and some under the water; then 600 yards to ponta do Agoa.

Landing.—The best landing place, which, however, is not free from surf, is on the east side of the reef, east of Pyramid rock; as the shore at this place is rocky, it is advisable to engage a native at first. The surf is said to be heaviest between March and December.

Ponta do Agoa is rounded, formed of cliffs moderately high, and bordered by rocks, part of which are above water; south of the point is a running stream of good water, difficult of access on account of rocks and surf. Casks and breakers must be floated ashore, filled, and brought off in the same manner, to obtain water—an operation that is always tedious, and oftentimes impracticable.

Passage point lies 800 yards SE. of ponta do Agoa, and rises almost perpendicularly to a mount, whose face presents needle-shaped rocks.

Passage rock.—About ½ mile N. 31° E. (N. 48° E. mag.) of Passage point lies Passage rock, broad and flat, with a passage of 6 and 7 fathoms between it and the beach.

Turtle island.—About 600 yards N. 31° E. (N. 48° E. mag.) of Passage rock is Turtle, or Tartaruga, island. It is of moderate height, and, when seen from the offing, resembles an inverted calabash with its neck toward the shore. The island is steep-to, and the channel between it and Passage rock affords depths of 6 and 7 fathoms. Two rocky crests appear nearits NE. side.

Tides.—It is high water, full and change, at Annobon island at 3h. 45m.; rise of tide 5 feet.

Anchorage.—The anchorage at Annobon island is not good, as the bottom is rocky and a heavy swell occasionally sets in from the SE. Between San Antonio and Passage points the shore is fringed by a shallow bank, extending, in some places, 400 yards off shore. The best anchorage to be found off the island is NE. of the town, ½ to ¾ mile, in 10 to 15 fathoms, sand, good holding ground. The water is smoother here than at other places, and landing may be easily effected. The bearings from this position are Turtle island S. 57° E. (S. 40° E. mag.) and Polo peak S. 10° W. (S. 27° W. mag.).

Another anchorage, affording facilities for watering, is in 6 or 8 fathoms, with Turtle island N. 78° E. (S. 85° E. mag.) and Passage rock S. 45° E. (S. 28° E. mag.). This position is near the watering place, where excellent water may be obtained, but only by leading a long hose from a hand pump through the surf to the boat.

Current.—A northwesterly current of from ½ to $1\frac{7}{10}$ knots an hour has been experienced in the anchorage and approach. The stream was weakest at time of new moon. Greatest rise of tide 8 feet, (December, 1891).

Caution.—The anchorage between San Antonio and Passage points must be approached with caution, as H. M. S. *Supply*, in January, 1873, anchored

off the Pyramid rock, with it bearing S. 81° W. (N. 82° W. mag.), Passage rock S. 42° E. (S. 25° E. mag.), Turtle island S. 74° E. (S. 57° E. mag.); these bearings should have placed her in 17 to 19 fathoms by the chart, whereas she had only 8 fathoms, hard bottom, evidently of coral, as the bottom could plainly be seen.

Coast.—From Passage point the coast trends about south for 2½ miles to Martinho point, the shore between being nearly straight, with an intervening rocky point, on which are several black rocks, and one assuming the form of a sugar loaf. Then the shore trends S. by W. nearly a mile to South point, low and sharp at its extremity, but rising suddenly to pico dos Sulcadōs. The coast between these points forms two small bays, at the most northern of which is the village of San Juan.

Lagos point, at the SW. end of the island, is distant nearly a mile west of South point. It is rocky, and rounded in form, with a considerable reef of offlying rocks, on which the sea generally breaks.

Adão islet.—About 800 yards S. 10° W. (S. 27° W. mag.) of South point is Adão, or Adams, islet, small and rocky, and presenting two heads when seen from the east or west. About S. 13° W. (S. 30° W. mag.), one mile distant from Lagos point, are three islets or rocks named Santarem, Escobar, and Fernando Po, after the three navigators who discovered the islands in the bight of Biafra. These rocks are seen a distance of 18 miles. The locality has not been sounded over, but it is presumed that, like the coast of the island, these rocks are steep-to.

Coast.—Between Lagos and Alvaro points the coast forms a bay, and on the latter point is a peak of moderate elevation, formed of needle-shaped rocks. From Alvaro point to Esteves point, the NW. extremity of the island, the coast trends NNW. for 3¼ miles; formed of cliffs. It is safe and steep-to, but the small bights offer no shelter, and, with rock bottom, this part of the coast is not frequented.

Winds.—The prevailing winds, from south and SW., blow with moderate force and little variation throughout the year, thus enabling vessels under the shelter of the land to ride at anchor in smooth water. Only during the months of March and September, when tornadoes from the eastward prevail over the general sea breeze and blow directly into the anchorage, is any danger to be apprehended, but as the gloominess of the sky and the heavy thunder and lightning by which they are preceded always give timely notice, vessels not having good ground tackle may get under way and strand off until the storm, generally of short duration, has passed over.

Currents.—The currents around Annobon are very variable; nevertheless, the island appears to lie in the Equatorial current, which to the westward of the island sets WNW. with varying rate. In April and June it has been found to run from 15 to 24 miles in the twenty-four hours. To the

southward of the island the current sometimes runs WNW., and occasionally north, NNW., and even NNE. To the eastward of the island they most frequently set north, NNE., and even NE. During the seasons of calms the approach to the island is rendered difficult, and vessels have been known to be days in sight of the island before reaching the anchorage. To the NW. of Annobon island the Equatorial is almost always experienced, but between the island and cape Lopez, close to the main shore, the current sets NNE., while its direction is NW. 80 miles from the continent.

The influence of the Equatorial current is said to have a most beneficial effect on the climate of Annobon island, and on this subject, as well as on the Guinea and Equatorial currents generally, Captain Sabine, of the Royal Artillery, has written as follows:

"The occasional advance of the cold water of the Equatorial current to the island of San Thomé may assist in explaining an apparent peculiarity in the climate of that island, when compared with that of the coast of western Africa generally. At all the British possessions, from the Gambia, in latitude 13° N., to the forts on the Gold coast, June, July, and August are accounted the unhealthy months; while at San Thomé, on the contrary, these months are for Europeans the most healthy in the year, though not for the negroes, who then suffer from cold and rheumatism.

"Situated on the Equator, San Thomé has naturally two cold seasons or winters in the year, the sun being nearly equally distant in June and in December; but in June, July, and August is superadded the influence of the surface water of the ocean, several degrees colder than in November, December, and January, rendering the former months preëminently the winter of San Thomé.

"The comparative unhealthiness of Princes island to that of San Thomé, and of both to Annobon as the residence of Europeans, has been frequently and particularly noticed by the Portuguese authorities, and is universally recognized at the two former islands. It may be sufficient explanation to remark that Annobon is always in the Equatorial current, Princes island always in the Guinea current, and that the position of San Thomé is intermediate, and its climate is occasionally influenced by both. In tropical climates a very few degrees of temperature constitute an essential difference in the feelings of the natives and in the health of the Europeans."

Passages.—From Princes island to Ascension, the passage may generally be made by standing out on the port tack, and as the vessel advances to the westward she will come up, so as to fetch Ascension without tacking. About the middle of April, though rarely, a north wind will blow about Princes island for a day or two at a time.

From Ascension island a vessel will generally fetch well to windward of Annobon, but not always. During the month of May the best sailing vessels will not do more than reach the island on the starboard tack.

CHAPTER XIV.

ASCENSION, ST. HELENA, AND GOUGH ISLANDS, WITH THE TRISTAN DA CUNHA GROUP.

Ascension Island.

Ascension island, of volcanic origin, lies between the parallels of 7° 53′ and 8° S., and between the meridians of 14° 18′ and 14° 26′ W.; it is an elliptical form, its greatest diameter from east to west being 7½ miles, and its shortest from north to south, a little more than 6 miles. The area of its base at the surface of the sea is 38 square miles, and its circumference about 22 miles. The island was first discovered on May 20th (Ascension day), 1501, by João de Nova Gallego, a Portuguese, and was visited two years afterward by Alfonzo d'Albuquerque, who gave it its present name.

The surface of the island is exceedingly irregular, and from the sea presents a rugged and uninviting appearance. The greatest elevation is the peak of Green mountain, so called from the color of its summit, which is 2,820 feet above the sea, and may therefore be seen from a vessel's deck at a distance of 65 miles. From the summit of Green mountain about 40 tumuli of different magnitudes may be seen, being extinguished craters, and from many of them the direction of the lava currents may be traced on their way to the sea.

The Green mountain is surrounded by numerous other craggy peaks of less elevation, having between them deep gorges and dark ravines filled with scoria, pumice stone, and other igneous products. As the longitude of Ascension has been well ascertained, and the island lies in the track of homeward bound ships from the cape of Good Hope, it is generally sighted by most vessels for the purpose of verifying their longitude, though without any intention of anchoring, in which case the island may be passed on either hand as most convenient.

The soil is mostly lava, but is in a rapid state of decomposition; most of the soil is very dry and porous, and no sooner does the rain fall than it is absorbed and disappears.

The principal cultivation is on the Green mountain, where the rains fall more frequently than on the less elevated parts of the island. The principal garden is 2,500 feet above the sea, and here the climate is delight-

ful, the average temperature during the day being about 75°, while at the landing place it is usually 85°. The temperature of the peak is still lower, and a thermometer placed in the shade on the peak, with the sun shining, has been known to fall to 60° at 1 p. m. The average height of the barometer on the peak is 27.75 inches.

The summit of Green mountain, covered with rockroses and several species of fern and mosses indigenous to the soil, rises a graceful oasis amid waste and desolation, for around it is to be found neither verdure, shade, nor shelter. As early as 1830 there were 100 acres under cultivation, besides the rich soil contained in many ravines and hollows, where no doubt fruit trees will ultimately be planted. The mountain is generally more or less obscured by mist some part of the 24 hours, and the condensation supplies a large quantity of water, which is conveyed through pipes to covered tanks in Georgetown, and not only supplies the residents of the island, but also affords a considerable quantity for shipping.

There is a road from Georgetown to the Green mountain, the distance to the foot being 3½ miles and to the summit 6 miles. The neat little establishment known as the Mountain house stands at an elevation of 2,250 feet above the sea, and is picturesquely situated on the brow of a hill. The view from this place over the whole island is very grand, for craters of extinguished volcanoes of various heights are seen in all directions, but not a vestige of vegetation below the summit of the mountain. A crater more rugged and terrific in its appearance than the rest, and known as the Riding School crater, lies to the eastward of Green mountain and is accessible by means of a road winding to its summit, which is walled in by a bridge of lava.

Settlement.—In the year 1815 the British government took possession of the island; and in 1821 the garrison was formed of a company of marines, and by detachments from this corps the improvements on the island have been conducted. The only buildings then existing were a barrack and storehouse near the present landing place, and their site appears to have been selected rather with regard to the eligibility of the ground in its neighborhood for being leveled and prepared for building on than as the best spot for the all-important purpose of communicating with the sea.

Near Dampier springs a house was built and gardens laid out for the cultivation of vegetables; but little more was then effected on the island, except the erection of some scattered huts on the leeward shore, and the clearing of a few necessary roads.

In 1830 the collection of government buildings and wooden houses had become dignified with the name of Georgetown, and a cottage for the governor was erected on the side of Cross hill, overlooking the town, fort, and bay.

By the month of March, 1833, the island was fortified at all accessible points, and the establishment numbered nearly 300 souls. A new battery, fort Thornton, had been constructed close to the landing place to mount seven guns, and near it a large covered tank to contain 1,700 tons of water. Iron pipes of 3½ inches in diameter and extending 33,000 feet had been laid down, reaching from the Green mountain to the town, and brought down in many places perpendicular, especially between the mountain and Dampier springs. A tunnel 930 feet long and 6½ feet in height had also been cut through a solid mass of cinder 200 feet above the government buildings at Green mountain to carry a pipe through to lead the water. There are also condensers for distilling.

Since 1833 improvements have been steadily on the increase, and so great has been the supply of water from the Green mountain to the covered tanks as to permit the establishment to be increased to 500 or 600 souls, if required, but at present there are only 180 people living on the island, all of whom are under the control of the governor.

Supplies.—Vessels proceeding to the island should, if possible, fill up with water at their last point of departure, for it is only supplied at Ascension in case of absolute necessity. The English have placed a high price on all stores and supplies for merchant vessels to be obtained from the government storehouses, in order to discourage a dependence upon them for such articles.

The great use of the island now is a sanitarium, and a good staff of medical officers is maintained.

Climate.—The climate of Ascension island is singularly healthy, owing to its being situated in the heart of the SE. trade wind, which blows with a moderate breeze, and cools and ventilates every part of the island. Again, the dryness of the atmosphere, the absence of marshy soil and decayed vegetable matter, or indeed anything likely to produce impurity, all contribute to the elasticity and buoyancy of the air, and render the island a most desirable spot for an invalid.

Fever has occasionally been imported from the coast of Africa, but there is none epidemic or peculiar to the island. A mild species of dysentery is the most common complaint, and beyond this there is none to be specified. The people on the island have a healthy appearance, and though exposed to the sun no ill effects ensue. Sores heal readily, fractures unite quickly, inflammatory complaints are not obstinate, and, on the whole, the inhabitants enjoy uninterrupted good health.

During the period when the sun has south declination, from the end of September to the end of March, which, as a matter of course, is the hottest season at Ascension, the thermometer during the day ranges from 84° to 92° in the shade; it is rarely below 82° in the night. But from March to September the thermometer ranges from 76° to 82°, and in the evening

sometimes there is a fall of dew. The cool season is also the driest. The barometer never rises above 30.1 inches nor falls below 29.8, and it is lowest during the hot season.

The rainy season is about March and April, and though generally there are only a few showers, yet some seasons are remarkable for the quantity of rain that falls. The average fall of rain throughout the year is very small, and it is this circumstance that constitutes the great drawback to natural advantages of the island.

During the months of March and April lightning is sometimes seen in the north and NW. quarters, and thunder is occasionally but very rarely heard. In May the clouds have frequently a motion from the west and NW., against the usual trade wind, and light airs from those quarters will sometimes occur. The fact of the mountain being frequently enveloped in mist renders the habitations damp, though not unhealthy, except for rheumatic disorders, which sometimes become acute. The rains in the lower parts of the island generally come on at night or early in the morning.

Resources.—At the agricultural station the soil produced by the decomposition of the volcanic matter is rich and productive, though only a portion of it is cultivated. Vegetables are, of course, more or less abundant as the season proves propitious or otherwise, but the sweet potato is more largely cultivated, being the most useful of the vegetables.

The castor oil plant thrives on the Green mountain, and crops of Indian corn have also been produced; and since its cultivation it has been said the rains fall more abundantly than before. The stock, consisting of horses, cows, and sheep, is kept on the Green mountain, where the residence is cool and agreeable. Wild guinea fowl are numerous, but are not permitted to be shot without a license from the government.

Turtle.—Ascension is visited by turtle between December and July, and it is supposed that during the above period each female makes three or four nests. The animal remains on the coast until fifty or sixty eggs are fit to be deposited in the sand, and lands on the beach between ten at night and four in the morning. She then proceeds 150 or 200 yards above high-water mark, digs a large pit about eight or ten feet in diameter and two or three deep, in which the eggs are deposited and carefully covered over with sand; the process of incubation being left to nature. In nine or ten weeks the young turtle breaks its prison, and, working its way through the sand, gains the surface and immediately takes to the sea, after which they are never seen until they are full grown. Should this short journey, however, happen in daylight, many of the young animals are picked up and devoured by the man-of-war birds, who are ever hovering over the turtle nests.

During the height of the season fifty or sixty turtles are frequently

turned of a night when they come to deposit their eggs in the sand. On such occasions men are stationed during the night in the bays they frequent, to turn them over on their backs, in which position they are perfectly helpless, and are thence transferred to ponds in the town. The turtle when fully matured weighs from 400 to 800 pounds, but it is worthy of remark that no male turtle ever make their appearance on the beach.

Turtle may be purchased, but the turning of turtle by strangers is strictly prohibited; and any person guilty of a breach of this regulation is subject to a heavy penalty.

Fish.—There is an abundance of excellent fish to be caught among the rocks throughout the year, such as rock cod, mullet, conger eel, cavalhoes, etc. The best place for fishing is on the reef near the anchorage. Crayfish are also caught near the mouths of the caverns among the rocks toward English bay by hanging a piece of pork or fish a short distance below the water at the mouth of a cavern, when the crayfish will rise to the bait, and may be taken by hand. Oysters are abundant, but not good.

Birds' eggs.—Among the articles of food obtained at Ascension, the eggs of the tropical swallow, or "wide-awake," furnish an important item, and they are taken in large quantities during the season, which is irregular, and only occurs about three times in two years. In appearance the eggs resemble those of the plover, but, though the bird is small, the size of the eggs is nearly equal to that of the common fowl.

Animals.—The animals indigenous to the island are wildcats and goats. Rats and land crabs also abound. The cats are numerous, but instead of destroying the rats they prey on the sea fowl that frequent the island to lay their eggs.

The insect tribe are dreadfully annoying. Flies are so numerous that at meal times they blacken the table cloth. Ants and mosquitoes are innumerable, while scorpins, centipedes, large spiders, and crickets abound.

Clarence bay.—The usual place of anchorage for vessels visiting Ascension is about ½ mile in length and 400 yards in breadth inside the line joining its boundary points, and is situated on the NW., or lee shore, of the island. The NE. point of the bay is a point formed of lava rock, and known as Bates point, while the SW. point of the bay is occupied by fort Thornton, immediately to the westward of which is the jetty which forms the landing place.

The principal buildings, such as the barracks, hospital, fort, residences of officers, etc., stand high above the beach, and face the shore to the westward of fort Thornton.

Signals.—About ½ mile behind the town is Cross hill, 870 feet high; it has a flagstaff, from which signals are made to vessels entering the bay, or passing the island.

Shoals.—An extensive mass of shoals, with depths ranging from 2¼ to 4¾ fathoms, having rocky and uneven bottom, extends upward of ½ mile to the WNW. of fort Thornton, and fringes the coast to the southward for more than a mile; and though there is anchorage ground to the southward of these shoals, it should never be used for that purpose, on account of the frequency of the rollers, which, after breaking on the shoals, often reach the landing place and prevent all communication between the shipping and the island for several days in succession.

The origin of these shoals is attributable to the fact that upward of forty craters have in former times been in a state of activity, and, as the island lies under the influence of a constant brisk SE. wind, the ashes, pumice stones, etc., after ejection from the volcanoes have been carried into the sea to leeward of the island, and there formed a bank of soundings affording excellent anchorage. The bank thus formed has been augmented by vast quantities of shell, ground and polished by the action of waves, and of these minute shelly particles the various beaches on the lee side of the island are composed.

The formation of such banks on the lee side of islands occurs, as a matter of course, where prevailing currents of air and sea exist, for the dust of the air must necessarily be deposited to leeward, while a portion of matter held in suspension by the strength of a current will always be deposited on the side of the island remote from the direction of the stream; and thus banks are formed, as at St. Helena, Ascension, the Madeiras, Canaries, and Cape Verde islands. The 100-fathom line extends about 2¼ miles off the NW. and SW. shore of Ascension, thence tapering with some irregularities of outline to ½ mile off the SE. point of the island.

Ridge.—At the distance of ¼ mile N. 25° W. (north mag.) of fort Thornton, lies a ridge of rocks from 200 to 300 yards long in a WNW. and ESE. direction, with depths ranging from 9 to 12 fathoms.

Buoy.—A buoy marks the NE. extremity of this ridge, distant 600 yards northward of fort Thornton.

Anchorage.—At the distance of 500 yards N. 25° W. (north mag.) of fort Thornton lies a ridge of rocks from 200 to 300 yards long in a WNW. and ESE. direction, with depths ranging from 9 to 12 fathoms. Vessels are recommended, in taking up a position for anchorage, not to bring Pyramid rock to the northward of N. 37° E. (N. 62° E. mag.). There is also a ridge of rocks 100 yards ESE. of the moorings formerly used by H. M. S. *Flora.*

Coal.—About 2,000 tons are usually kept in stock. Between December and April coaling is interrupted at times for many days by the rollers and occasionally at other times of the year. Coaling is by lighters of 15 to 20 tons.

Repairs.—There is a crane capable of lifting 5 tons and sheers capable of lifting 10 tons, with a depth of 9 feet alongside of them.

Lights.—At Georgetown no lights are ever exhibited except as signals to boats during the rollers, viz.: Red light, landing is safe; green light landing dangerous. A gun is fired if a vessel is seen standing into danger.

Wreck.—The wreck of the ship *Sir Charles Napier* lies in 9½ fathoms, with the following bearings: Pyramid point N. 49° E. (N. 74° E. mag.), Pier head S. 71° E. (S. 46° E. mag.), and Catherine point S. 20° E. (S. 5° W. mag.).

Buoys.—Two buoys composed of single spars, painted black and white, and surmounted with vanes, mark the shoals abreast of Georgetown. The outer spar buoy is moored in 9 fathoms, westward ⅛ mile from fort Thornton and the Green Mountain peak, just touching the south side of Cross hill; but vessels should not anchor to the southward of this buoy for reasons already given.

The inner spar buoy lies NW. ¼ mile from fort Thornton, and marks the NE. side of the shoals. It will be seen by reference to the plan that large ships can not cross between the two buoys, but if approaching from the westward keep a good offing until Cross hill comes open to the northward of fort Thornton, which mark leads northeastward of the shoals.

Mooring buoys.—A mooring buoy formerly used by H. M. S. *Flora*, lies in 10 fathoms, with fort Thornton bearing S. 3° E. (S. 22° W. mag.), and summit of Cross hill S. 39° E. (S. 14° E. mag.). Smaller buoys for use of lighters are moored nearer the shore.

Tides.—It is high water, full and change, in Clarence bay, Ascension island, at 5h. 30m.; springs rise 2 feet.

Directions.—The shores of the island are all clear and steep-to, excepting those already alluded to off Georgetown, and the north point of the island, off which foul ground extends ½ mile, on which vessels have struck by endeavoring to haul too close round the point, and therefore care should be taken to preserve a sufficient offing when passing this locality.

Vessels intending to anchor, should run along the NE. side of the island about a mile off shore, and after passing North point at a distance of ½ mile, haul up on the port tack, when with good management and attention to flaws, a vessel will generally reach the anchorage in Clarence bay without tacking, taking care to shorten sail in time; and, on anchoring, a good scope of chain should be given, as sometimes the wind blows fresh off the high land.

A good outside berth will be found in 11 fathoms, with fort Thornton S. 25° E. (south mag.) and Pyramid rock N. 43° E. (N. 68° E. mag.), but the usual anchorage is a little further in shore, in 9 to 10 fathoms, northward of the ridge buoy. Ships generally lie at single anchor, with their heads toward the land, but instances have been known where vessels

have tailed in shore, and as they are almost continuously rolling, it is necessary when selecting a berth, to bear this fact in mind. The SW. side of the bay should be avoided on account of the foul ground and the proximity of the rollers over the shoals.

Roller signals.—When landing is difficult or impracticable, roller signals are displayed from the end of the jetty. One checkered flag denotes that no loaded boats can land or leave the shore; two checkered flags, that landing must not be attempted. Ordinary (single) rollers sufficient to stop lighters lying at the pier may be said to present themselves about once a fortnight. The single roller as measured on the steps of the pier, rises 5 feet 3 inches above the level of the sea, and the double roller 10 feet 6 inches.

Navigating Lieut. A. Miller, H. M. S. *Amethyst*, 1875, observes: "When the single roller flag is up, boats may land with officers, etc., but very often find difficulty in getting alongside the steps; here, as elsewhere, the third roller is generally the heaviest, after which the boat should shoot in close round Tartar rock, steering well to the left of the steps until close to the rocks outside them, when hard a port, and she will be carried up to the steps by the set between Tartar rock and Thornton bluff."

Comfortless cove.—About a mile to the NE. of fort Thornton is a small bay, with a spot of sandy beach known as Comfortless cove, where landing may often be effected when impracticable at the jetty in Clarence bay. The shore, however, is composed of a mass of irregular-shaped clinkers, which would have required much labor to level as a site for the necessary buildings, had the place been selected as a landing place.

Southwest bay.—From fort Thornton the shore trends SW. $\frac{2}{3}$ mile to Catherine point, and off this portion of the coast are the shoals already described; thence the coast takes a southerly trend for a distance of nearly 2 miles to Southwest bay, the intervening coast presenting a succession of small points clear of offlying danger. Southwest bay is $\frac{1}{4}$ mile broad between McArthur head and Portland point to the SW., and has a fine sandy beach, which is much frequented by turtle during the season.

From Southwest bay, round by south and east, to Northeast bay the shores of the island are high and inaccessible, with an iron-bound coast and deep water, and as nearly the whole of this portion of the coast is exposed to the full force of the SE. trades, the sea breaks against the shore with much violence.

Rollers.—The phenomena of rollers at Ascension and St. Helena, have been much commented on, and various causes assigned for the origin of these mysterious visitors, which break with fearful violence on the lee side of the islands, and whose advent is not foretold by any apparent disturbance in earth, air, or sea. Many ingenious speculations have been advanced, and the varied opinions on the subject have elicited much dis-

cussion, but the general impression appears to be that these huge ocean ripples are the progressive undulations caused by distant storms in the Atlantic oceans of either hemisphere.

The rollers at Ascension are thus described by Mr. W. H. B. Webster, Surgeon of H.M.S. *Chanticleer*, 1829:*

"One of the most interesting phenomena at Ascension are the rollers; in others words, a heavy swell producing a high surf on the leeward shores of the island, occurring without any apparent cause. All is tranquil in the distance, the sea breeze scarcely ripples the surface of the wave, when a high swelling wave is suddenly observed rolling toward the island. At first it appears to move slowly forward till at length it breaks on the outer reefs. The swell then increases, wave urges on wave, until it reaches the beach, where it bursts with tremendous fury.

"The rollers now set in and augment in violence until they attain a terrific and awful grandeur, affording a magnificent sight to the spectator, and one I have witnessed with mingled emotions of terror and delight. A towering sea rolls forward on the island, like a vast ridge of waters, threatening, as it were, to envelop it; pile upon pile succeeds with resistless force until, meeting with the rushing offset from the shore beneath, they rise like a wall and are dashed with impetuous fury on the long line of the coast, producing a stunning noise.

"The beach is now mantled over with foam, the waters sweep over the plain, and the very houses of the town are shaken by the fury of the waves. But the principal beauty of the scene consists in the continuous ridge of water crested on its summit with foam and spray; for as the wind is off the land, the overarching top of the roller meets resistance, and is carried, as it were, back against the curl of the swell; and thus it plays elegantly above it, as it rolls furiously onward, graceful as a bending plume; while, to add more to its beauty, the sunbeams are reflected from it in all the varied tints of the rainbow.

"Amid the tranquility that prevails around, it is a matter of speculation to account for this commotion of the waters, as great as if the most awful tempest had swept the surface of the ocean. It occurs in situations where no such swell would be expected, in sheltered bays, and where the wind never reaches the shore. The strong and well-built jetty of the town has once been washed away by the rollers, which sometimes make a complete breach over it, although it is 20 feet above high-water mark. On these occasions, the crane at its extremity is turned round in various directions, as the weathercock is turned by the wind, and landing becomes impracticable for two or three days together.

* Captain J. East, 1877, in his remarks, states that the heaviest rollers occur in the months of December, January, July, and August, and that the clear or muddy appearance of the water is a sure sign of the subsidence or rising of the rollers.

"Such are the rollers of Ascension, and like unto them are those of St. Helena and Fernando Noronha. The season at which the heaviest rollers prevail is from December to April, not but what they do occur at other periods, and they have been felt severely in July. Vessels in the bay are perfectly secure, and they have to apprehend no danger unless within the immediate influence of the breakers. Not only are the seasons of the rollers the same at St. Helena and Ascension, but they sometimes are simultaneous in occurrence.

"The rollers occur in the most tranquil season of the year, when the SE. trade wind is often very light, where the vast volume of water is constantly impelled in one direction. There is then a tendency to a back set, or a rush of water in a contrary direction, and a tumultuous swell is produced wherever it meets with the resistance from the islands and banks on which they are based, as well as the shores of the continent. The long steep beaches of Ascension are admirably adapted for the full display of the effect which has been just described."

As before observed, the rollers of Ascension and at St. Helena are now understood to be caused by distant gales of wind, either in the North or South Atlantic, blowing in the direction of the island. The heaviest rollers are those caused by the undulation of the surface of the ocean after a NW. gale in the North Atlantic, which takes place in the winter and spring of the year, from November to April; and its southeasterly direction brings it at once to the islands without any break, until it arrives at the anchorages; whereas those undulations coming from the South Atlantic have to circle round the islands and to reach the anchorage bays by a lateral course from the NE. and SW. points of the islands, which, were they of greater extent than they are, would prevent the undulation from the southward curling into rollers at all.

At Ascension, the soundings are comparatively speaking so shallow, especially on the reef to the westward of Clarence bay, that a very moderate swell caused by even a fresh trade wind is sufficient to cause the rollers to set in over the reef. This leads them right up to the landing place, and causes great inconvenience.

On the eastern side of the bay, the water off shore is deep enough to prevent the swell acquiring the character of breaking rollers, except in cases where the undulation comes from the NW. and breaks directly upon the island. Even in this case, the guard ship was never disturbed at her moorings in 9 fathoms, which would tend to demonstrate that in the very worst cases the rollers do not actually break at that depth.

When the undulation of the ocean on its arrival at the island happens to coincide with the full or change of the moon, its depth and weight is enhanced; and to this cause is to be attributed the fact that on the coast of Africa, south of the Equator, the rollers are always worse at those seasons

when the South Atlantic gales from SW. may be expected. For instance, at Ambriz the heaviest surf is said to prevail at full and change during the month of August, but this rule has its exceptions, as in March, 1871, H. M. S. *Hart*, while at anchor off Ambrizette, experienced very heavy rollers, which broke in 4½ fathoms water. To the northward of the Equator, although the water is seldom very deep near the land, rollers, properly speaking, are very rare, though not altogether unknown.

Mesurada bay, the anchorage of Monrovia, the principal town of Liberia, where the anchorage is in 6 or 7 fathoms, is sometimes visited by rollers; and when they do occur, it is always during the southern winter, when the undulation of the southerly gales reaches across the equator. The configuration of the great continent prevents the effects of the winter gales of the North Atlantic from having any influence on its coasts south of cape Roxo. In June, 1844, the rollers set in so dangerously at Monrovia, that the vessels in Mesurada bay at anchor in 6 or 7 fathoms, including an American man-of-war, escaped to sea with much difficulty, favored by a breeze from the unusual quarter of SSE.

Passages.—The following remarks on the passages for sailing ships between the coasts of Africa, Ascension, and St. Helena are condensed from those of experienced officers:

Vessels proceeding to the coast of Africa should in all cases call at Sierra Leone to ship their Krumen and to complete water. Sierra Leone, at any rate, is on the real route for Ascension at all times of the year, except during the month of November, when the long-continued calms and strong NW. currents in its neighborhood often prevent vessels from getting round St. Ann shoals for a fortnight. From November to April the best passage is inside the Cape Verde islands, keeping well over on the African coast after passing them.

After May the SW. monsoon begins to make, and the NE. trade wind is kept longer by going to the westward of the islands, after which the winds will be from the southward and the current NE., so that, after losing the NE. trade, Sierra Leone may be reached at once on the starboad tack.

Sierra Leone to Ascension.—After leaving Sierra Leone, a vessel should pass St. Ann shoals and run down the coast of Africa within 50 miles of the land until past cape Palmas; whence she must make the best of her way aided by the Guinea current to cross the equator in from 3° to 8° west longitude, and then without making a tack, favored by the Equatorial current, will probably fetch Ascension after a passage of 15 or 16 days from Sierra Leone.

Ascension to the coast of Africa.—From Ascension a vessel should fetch on the starboard tack the coast of Africa in from 13 to 15 days, but at various points, from cape Lopez as far to windward as Loanda, or even

farther to the southward, according to the season of the year; in the month of May the wind hangs to the eastward all the way over, and a vessel will not weather Annobon island; generally, however, a good sailing vessel carrying a press of sail will fetch to windward of the Kongo stream.

The late Capt. Matson, R. N., recommended vessels proceeding toward the coast to tack rather than go farther to the northward than the parallel of 3° S., though by tacking a vessel will have to contend with a heavy head sea and a strong lee current; his remarks are as follows:

"I have scarcely ever found the compass direction of the winds to vary during sixteen passages between the coast and the islands. It is easy to make the passage direct from the islands to the coast on the starboard tack; but, until I made the passage from Ascension to the Kongo river, in February, 1840, it was the invariable practice of the cruisers to stand to the southward from Ascension until they could weather St. Helena, a dead beat of 700 miles.

"A stranger would certainly consider the latter to be the preferable route, for he would not believe it possible to reach Benguela, apparently 1,600 miles dead to windward, by keeping on the starboard tack; and the knowledge that the wind generally blows up the coast from the southward, with a lee current, would cause him to be more afraid of approaching the coast and having to beat against it.

"Two precautions are, however, requisite; first, not to go to the northward of 3° or 4° South latitude; and, secondly, not to bring the port to bear to the southward of S. 35° E. An occasional short tack, as the wind veers a little, may therefore be necessary, but the whole passage may sometimes be made with a flowing sheet."

Ascension to St. Helena.—To reach St. Helena from Ascension a vessel should at first keep on the port tack to make southing. This passage averages 18 days.

Bight of Benin to Ascension and back.—Commander F. W. Richards, of H. M. S. *Dart*, writing in 1865, observes: "In making the passage from the bight of Benin to Ascension, vessels should go off on the starboard tack as far as the equator, when they will generally weather St. Thomas island. They should then tack, and although they may make one or two degrees of northing at first on the port tack, they will be sure to come up again as they draw to the westward out of the bight. When on the port tack, however, care should be taken not to pass beyond the limits of the Equatorial current, whose average northern boundary in the meridian of Greenwich, and 5° E., is in about latitude 1° N.

"When returning from Ascension to the bight of Benin the winds favor in a similar manner, for starting with the wind a point free, and a studding sail set, though at first little better than a north course is made, the wind heads gradually round to south and SW. as the coast is approached, and

any part of the bight may readily be reached. In making the passage to the south coast from Ascension in the *Dart* in November, though in the first instance carried up to latitude 1° N., the ship came up point by point, and fetched the Kongo river with the studding sail set in 16 days."

The foregoing opinions respecting the starboard tack route between Ascension and the Kongo, are somewhat modified by Mr. J. T. C. Webb, Master, R. N. In his remark book he states:

"I have generally found in the dry season, when the sun is north of the equator, that the SE. trades are stronger and more to the eastward than during the wet season. In the latter season a vessel might leave Ascension and easily fetch the Kongo, as the wind gradually hauls round to the SW. as she approaches the coast; but in the dry season a difficulty will be found in getting so far to the southward on the starboard tack, owing to the Equatorial stream and the calm belt. I should therefore recommend when making this passage during the dry season to work to the southward and constantly take advantage of the wind; by so doing a good working breeze will be maintained in the strength of the trades, and the Equatorial stream and light winds be avoided."

St. Helena Island.

St. Helena, so well known to many a homeward bound voyager, is 1,700 miles from the coast of Africa, and 700 miles from the island of Ascension. Its position is between the parallels of 15° 54′ and 16° 1′ South latitude; and the meridian of 5° 39′ and 5° 18′ West longitude; its length from east to west being 9 miles, and breadth from north to south nearly 6 miles. The area of the island is about 47 square miles, or 30,000 acres, of which about 11,000 are cultivated; 7,652 are devoted to pasturage, and the remainder waste.

The island is said to have been discovered by the Portuguese admiral João da Nova Galego, on St. Helena day, 1501. In 1513 it became the voluntary abode of Fernandez Lopez, a Portuguese nobleman, on returning from India, who, being left here with a few servants, and some useful animals, assiduously cultivated its resources. In a few years he was recalled to his own country, and made known the advantages of St. Helena to the East India trade.

For some time after the departure of Lopez the island does not appear to have been regularly inhabited; but in 1640 the Dutch attempted to establish a settlement here, which in 1651 they relinquished to the English East India Company; and to this company the entire possession and sovereignty of the island were granted by Charles II, in a charter, dated April 3, 1661. At the close of 1672, the Dutch again obtained possession; but it was recaptured the following year.

To accomplish the recapture of the island, Capt. Munden landed a force of 200 men under Capt. Kedgwin, in Prosperous bay, on the weather side of the island, and the successful scaling of the almost inaccessible cliffs is yet commemorated by a precipitous rock, known as "Hold Fast Tom," from a caution given to the gallant blue-jacket who first ascended to fix a rope for his comrades. While this party was advancing through the island, Capt. Munden sailed round to James valley and opened fire on the Dutch forts, a simultaneous attack being carried from the heights. The name of the commander of the enterprise has been handed down to posterity by the erection of a fine work on the cliffs, now known as Munden's battery.

The island thus relapsed by conquest to the Crown, but was regranted by the King to the East India Company, in whom the property and sovereignty continued to be vested until 1836, when it was transferred from the company to the Crown.

Although St. Helena from its position lies in the strength of the SE. trade winds, light airs are frequently experienced from the NW. for days in succession, thus causing a cessation of the trade. The island is usually sighted by ships from a distance of 60 miles, when it makes like a huge pyramidal-shaped fortress rising from the sea, and presenting no signs of vegetation; but on a nearer approach the prospect gradually improves, though the precipitous and almost inaccessible cliffs appear more striking when contrasted with the verdant tint which marks the summit of the hills, and gives an additional charm to the valleys in the eyes of the voyager.

The island is surrounded by a wall of precipitous cliffs from 1,000 to 1,800 feet in height, intersected by chasms serving as outlets for the streams from the high lands of the interior, and terminating in small coves more or less exposed to the fury of the waves. There are no less than twenty-three of these openings around the coast, but landing is almost impracticable, except on the NW. or leeward side, though in very favorable weather it may be effected in Prosperous and Sandy bays, situated respectively on the east and south sides of the island.

The island is divided into two unequal parts by a lofty ridge of mountains from 2,000 to 2,700 feet above the sea level extending in a semicircular sweep from the SW. point to Stone Top point to the SE. The principal eminences on the island are: Diana peak, 2,704 feet; High peak, 2,635 feet; Halleys mount, 2,467 feet; and Flagstaff hill, 2,272 feet. Diana peak, the summit of the chain, is the highest peak of St. Helena; and this mountain commands a magnificent prospect of all the island, with its numerous ridges and hollows.

Numerous spurs branch off from the chain of hills, those to the north and SE. decreasing in altitude, but increasing in extent as they approach the

sea, where they terminate in precipitous cliffs and form the village opening on the coast. The spurs from the SW. of the ridge are suddenly broken about 1½ miles from their commencement, the land which they originally supported having subsided, leaving but a wreck of the original formation, with here and there towering fragments of basalt, like the buttresses of a gigantic ruin.

These isolated masses are the evident results of some volcanic disturbance, and several of them assume curious and fantastic shapes. Two of the most remarkable are situated near the south coast, and from some imaginary resemblance, have been named Lot and Lot's Wife; they are both formed of strangely contorted columnar basalt, and their summits are respectively 1,450 and 1,550 feet above the sea level; the former rising 197 feet, and the latter 160 feet from its base. Along the coast on this part of the island west of Sandy bay, there stretches for a considerable distance a stratum of horizontal columnar basalt, forming a stupendous wall 50 to 180 feet high. An isolated portion of this wall forms what is called the Chimney, a remarkable column of hexagonal basalt 64 feet high.

The island appears to have suffered at different periods from the effect of volcanoes and earthquakes; and by some it has been supposed to be the shattered remains of an ancient continent, connected in former ages with other rocks of the South Atlantic. The district of flat country, comprising the plains of Longwood and Deadwood, to the east of the island, would seem to support this theory, particularly as an indigenous tree (*Conyza gummifera*) which grows here is also found on Tristan da Cunha.

The remains of a vast crater are to be traced between Flagstaff hill and the Barn on the east side of the island.

Limestone is found in different parts of the island; gypsum is found near Prosperous bay; cornelian in Turks Cap bay, and the honeycombed basalt and red tufa, which exist in large quantities, afford excellent building material. A layer of fossil shells (univalves) has been discovered near Flagstaff hill, 2,000 feet above the sea.

The botany of St. Helena is interesting, affording nearly sixty species of indigenous trees and plants, including the tallow tree and ferns of great beauty. Trees and shrubs from all parts of the world have been collected in the gardens of Plantation house, where the oak, bamboos, aloe, pine, etc., flourish together. The main ridge of the island is covered with a luxuriant vegetation of tree ferns and cabbage wood, nourished by constant moisture; and on descending from this elevation the hill sides are clothed with the richest grass, and the water course, overhung with bramble and fuchsia; while lower down are woods of Scotch fir, larch, oak, and willow.

On approaching the sea, vegetation gradually disappears, the summits of the hills within 1½ miles of the coast being almost barren, excepting a

scanty growth of samphire. In the valleys, however, where the water can be procured, the gardens produce abundance of fruit and vegetables, especially bananas and pumpkins. The island appears favorable to the cultivation of coffee and cotton, particularly in the valleys to the south of the main ridge, which are well irrigated and extremely fertile.

Produce.—The available land of the island is chiefly devoted to pasturage, and the gardens to the cultivation of vegetables. Coffee has been cultivated with some success, and attempts made to introduce the tea plant. The sugar cane, cotton, and indigo have also been tried, but the rearing of cattle has been proved to be alike the most useful and remunerative.

Although the island is capable of supporting a large number of cattle, and it has been found that the horned cattle and sheep do not in any respect degenerate from change of climate, the demand necessitates frequent importation from the cape of Good Hope.

In the valleys by the shore, figs, oranges, pines, bananas, apples, peaches, guavas, and grapes are found; and potatoes, yams, pumpkins, cabbages, peas, and beans are generally plentiful. Grain crops are very uncertain, sometimes suffering from drought, and always from the depredations of rats, which are numerous and destructive.

The apple tree especially is very abundant; and in the deep black loamy soil of a valley near the SE. part of the island, having a run of water through it, issuing from the eastern side of Diana peak, there is an orchard of remarkably prolific apple trees, on which may be seen at the same time, the fruit in all its different stages, from the blossom to dropping ripeness. The potato is the principal article of agricultural produce, and those grown on the island are much esteemed.

The rocky islets round the coast swarm with sea birds, particularly the beautiful white bird (*Procellaria nivosa*); and the man-of-war bird, and tropic birds are to be seen wheeling their flight high above the lofty pinnacles of the island. Sea fowls deposit immense quantities of eggs around the island, which in the fall of the year are collected for food. The shores abound with fish to the extent of seventy species; among them mackerel and albacore are peculiarly abundant and form the principal food of the poorer inhabitants. Some descriptions of fish are, however, very unwholesome.

Sharks of great size and voracity are now and then captured; and during the month of August schools of whales (black fish) are frequently seen. No snakes or reptiles, except a few centipedes and scorpions, are found on the island. Rats, however, are a terrible plague, and nothing is safe from their depredations. The shellfish includes turtles, oysters, and two kinds of lobster.

Supplies.—Provisions of all kinds, and also coal, are to be obtained here, but they are very expensive. The water that supplies the town and

shipping is conveyed by means of leaden pipes from a spring in the James valley, distant more than a mile from the sea, to the jetty, where water, excellent in quality and abundant in quantity, may be obtained by application at the customhouse. It may also be procured from the Lemon Valley stream, whence casks may be filled with a hose, and there is a water tank for the convenience of those who do not care to use their own boats. There are two cranes on the jetty of James town for the use of boats.

Coal.—From 300 to 1,000 tons are usually kept in stock by the contractor. The coaling arrangements are good; the coal wharf is at the end of a pier, on which stands a crane equal to putting a ton of coal, in bags, into the lighter at each turn. A launch tows off the lighter, and as much as 250 or 300 tons can be put on board in a day. Labor is plenty. There is no coal depot.

Climate.—Of the climate under which such products are found, but little need be said, beyond the fact of its being considered salubrious. The temperature, as a matter of course, varies according to the elevation and exposure of different parts of the island; for instance, at High knoll, 1,906 feet above the sea, it ranges from 65° to 70°; at Ladder hill, 600 feet above the sea, from 70° to 80°; while in James town it is about 5° higher. Thus the summer heat is not higher than in England, the temperature being kept within reasonable limits by the cold waters of the South Atlantic current; and by the trade winds, which act as a constant ventilator, and bring with them a canopy of clouds sufficient to afford shelter from the vertical rays of the sun, and to admit of labor and exercise being carried on with impunity during the heat of the day.

The winter range of temperature is generally from 55° to 65°, and during this season vegetation of leaves proceeds with more equality perhaps than at any other. Seasons of drought have occurred, and cattle have perished for want of water; but rain is generally experienced at all seasons, especially during the months of June, July, August, and September, the Antarctic winter and spring. The annual rainfall is about 27 inches. Throughout the year the number of cloudy days exceed in a two-fold degree the number of those in which the rays of the sun fall on the earth without interruption, to scorch the vegetation. Lightning is a rare phenomenon at St. Helena and thunder seldom if ever heard.

The following is a summary of the weather at St. Helena: In January some slight rain falls, but the pastures are dried up. In February, sudden heavy showers frequently occur. In March, heavy continued rains prevail, with the thermometer in the town at 85°, but up in the country 72°. In April, the rains continue, but not so heavy. May is the last month of autumn, and June the first of winter, in which light showers fall toward the end. July is the middle of winter, when all vegetation stagnates. August is the last and coldest winter month; the thermometer then is 54°

in the country and 68° in the town. With September, the spring commences; and in October, the sheep shearing is finished; while November and December are the haymaking months. At the cape of Good Hope peaches are ripe in the month of December, while here, more than a month after, they are not half grown. Peaches and pomegranates do not ripen until April. This is noticed as an instance in the difference in temperature between islands and continents.

Population.—The population of St. Helena, according to the census of 1871, amounted to 2,999 males, and 3,242 females, making a total of 6,241.

In 1881 the population, excluding shipping and garrison, was 3,877.

James bay, the port of the island, is a small indentation on the NW., or leeward side, abreast of James valley, bounded by two high rocky hills—Ruperts hill on the east, and Ladder hill on the west—which gradually recede from each other as they approach the coast, where they terminate abruptly in two stupendous and perpendicular cliffs. The space inclosed between these heights is of a triangular form, about 1½ miles in length and 350 yards broad at its base, which faces the sea. In this confined spot is situated James town, which is entered from the sea side through an arched gateway, within which on the left is the government house and on the right is the church, a plain but not inelegant building, with a remarkable needle-shaped spire, which forms a conspicuous object from the anchorage.

The houses generally are two stories high, neatly built in the English style, and whitewashed, and the shops are plentifully supplied with English and Asiatic products, but the prices are invariably very high. The town contains many little gardens, groves, and shaded walks, and extends the whole length of the valley, which gradually decreases in breadth as it recedes from the sea. The residences of the principal inhabitants are built on the higher and cooler parts of the island.

On the right, or western, side the valley is bounded by the steep promontory called Ladder hill, the ascent of which by a well-engineered zigzag road is very easy; a ladder also leads straight up its face to the artillery barracks. On the eastern side of the valley the carriage road called Side path leads up to the interior of the island. This road, which was made with great labor and difficulty, has an easy ascent transversely to the level above, whence the prospect is striking and delightful, the view terminating by the sea horizon.

Longwood, the former residence of the Emperor Napoleon, stands on the plateau of Longwood, 1,762 feet above the sea toward the east of the island, containing the greatest quantity of level ground. A considerable portion of this plain is planted with trees, but it is deficient in water.

On October 15, 1815, Napoleon Bonaparte arrived here in H. M. S. *Northumberland,* and remained until his death, at Longwood House, on

May 5, 1821. His body was interred in Sane valley, beneath a group of willows, his favorite haunt during lifetime. The exhumation took place on October 15, 1840, when the remains were transferred to France and deposited in the Hotel des Invalides, at Paris.

Landing place.—The only landing places are in Rupert and James bays. On the shore of the former, facing the sea, stands a strong battery mounted with heavy guns; but for want of water the valley is not habitable. James valley is defended by works extending across the head of the bay and flanked by a high, inaccessible battery on Munden point, close under wich all vessels wishing to anchor in James bay must pass.

Lights.—There are three ordinary street lamps shown on the wharf, but they are not intended for harbor lights. One is at landing, one is at entrance to main gate, and another between the two. When the mail steamer arrives at night the wharf near the landing is lighted by the addition of three more lights.

Semaphore.—There is a semaphore station on King and Queen point. The International Code is used.

Time ball.—A time ball is dropped from a staff at the time office on the west side of the lines, James town valley, and from the yard arm of the flag staff at Ladder hill (for the convenience of vessels whose anchorage may be out of sight of the time office) at 1h. p. m., Greenwich mean time, daily, Sunday excepted, which corresponds to 0h. 37m. 10s. p. m., St. Helena (Ladder Hill observatory) mean time. As a preparatory, the ball is hoisted halfway at 5 minutes and close up at 2 minutes before signal. Persons desirious of rating or comparing chronometers may send them to the time office, or on application may have the signal repeated at any hour. Ladder Hill time ball can easily be observed by vessels passing within a few miles of the anchorage.

Pratique regulations.—No boat, except the health boat, is permitted to board or go alongside any vessel coming in before such vessel shall have been admitted to intercourse, which shall be indicated by a white flag at the main topgallant masthead.

Any vessel having a yellow flag hoisted at the fore-topgallant masthead is declared to be under quarantine.

Masters of vessels arriving at the port are not to leave, or permit any other person to leave, their vessel, either to come on shore or to go on board another vessel in the harbor before receiving pratique from the health officer.

Tides.—It is high water, full and change, in James bay, St. Helena, at 3h. 11m.; springs rise 3 feet.

Barn ledge.—When approaching St. Helena from the SE., the northeastern end of the island, called "The Barn," from its resemblance to a building, is easily recognized. Off Barn point is a small detached rocky

shoal, known as Barn ledge, with a least depth of 20 feet water on it, and 9 to 12 fathoms within 200 yards all round.

This dangerous ledge, which is generally marked by a heavy ground swell, lies with the north tangent of the island bearing N. 52° W. (N. 25° W. mag.), $1\frac{2}{10}$ miles; Turks cap, over Scraggy point S. 74° W. (N. 79° W. mag.); and George island (a detached rock off the SE. point of the island) just shut in with King and Queen point S. 4° E. (S. 23° W. mag.). To clear the ledge on its eastern side, keep George island well open of King and Queen point, until Sugarloaf point opens to the northward of Barn point.

Speery ledge.—This dangerous reef, of small extent, with pointed rocks having from 3 to 4 fathoms water over them, lies a little more than one mile off the SW. point of the island, and is generally marked by a heavy ground swell. From the danger, West point bears N. 40° W. (N. 13° W. mag.); Speery island, situated off the southern point of the island, N. 4° W. (N. 23° E. mag.); and Long Range point, N. 57° E. (N. 84° E. mag.). Between Speery island and the ledge the depths are from 24 to 35 fathoms.

To avoid Speery ledge, when approaching the anchorage from the southward, keep Shore rock (lying close off Gill point) open of Long Range point until West point bears N. 27° W. (north mag.), when this latter bearing will lead $\frac{1}{2}$ mile to the westward of the danger.

Directions.—As all ships should studiously avoid borrowing too closely on the weather shores of the island, it appears unnecessary to describe in detail the various salient points and indentations, more especially as the chart of the island contains all that is necessary to render navigation safe, and the only unseen dangers known to exist have already been described.

If approaching the anchorage from the eastern side of the island—the best route—use the marks already given to clear Barn ledge, and having hauled up for Sugarloaf point, be prepared to shorten sail, for very heavy squalls come down off Flagstaff hill and through Rupert and James valleys. Sugarloaf point may be passed within 200 yards, and the northwestern shore may also be approached equally near, as the shore is steep-to, and without offlying dangers.

On the west side of Sugarloaf point is a small fort, and a mile further on to the SW. is Rupert bay; immediately beyond is Munden point, after passing which, James town and valley will be open, and an anchorage must be selected in the most convenient place where a berth may be found, for the bay is generally crowded with shipping. If intending to remain any time, the best anchorage will be found well to the SW. about NNW. of Ladder hill, in 19 or 20 fathoms; this position will be clear of vessels constantly arriving and departing.

Vessels passing westward of the island, after having cleared Speery ledge, and rounded West point, should haul close to the wind on the star-

board tack, and, passing at a moderate distance from the shore, will soon be in a position to anchor, but any particular bearings would be useless, inasmuch, as already observed, a vessel can seldom choose her berth. The bottom in the roadstead is coarse sand and gravel. Anchorage is to be obtained all along the shore to the SW. of James bay as far as Lemon Valley bay in from 15 to 28 fathoms, about 800 yards from the shore. The bank off James valley extends in a northerly direction, and slopes gradually from 7 fathoms near the shore to 50 fathoms at the distance of one mile, whence the water deepens rapidly to 100 fathoms, and then no soundings.

Rollers.—The most singular phenomenon connected with this part of the ocean is the setting in of very heavy continuous swells or rollers from the NW., which are most prevalent during the months of January and February, when the waves break on the leeward shore with astonishing grandeur. During their continuance landing is extremely dangerous, and can only be effected by watching the intervals between the swells.

These rollers, as previously stated, rise almost simultaneously at Ascension and St. Helena, and without any apparent cause, for as a rule the weather is fine and wind light, although the spray of the surf beating on the beach rises to the height of 50 or 60 feet. Many lives have been lost in consequence of boats being capsized; and in February, 1846, thirteen vessels moored ½ mile off shore were driven from their moorings and totally wrecked, and the wharves and batteries also suffered considerable damage.

Passages.—St. Helena to the cape of Good Hope.—In this passage a vessel must make southing as quickly as possible, and as a rule will not be forced further to the westward than about longitude 14° W. before losing the SE trade in latitude 24° to 28° S., according to the season. With the variable winds found after losing the trade, get to the SE. into latitude 35° or 36° S. before reaching the meridian of Greenwich, when westerly winds will generally be found, with which the longitude may quickly be ran down.

Kongo river to St. Helena.—In making this passage the wind is often found to prevail from SSW. to south until about 300 miles from the island; there is, however, generally but little difficulty in reaching the island by keeping the port tack.

St. Helena to coast of Africa.—Vessels leaving St. Helena for the coast of Africa will generally fetch as far to the southward as Benguela, except in May, when the SE. trade has more easting in it, and the lee current runs strong.

Length of passages.—The passage under sail from St. Helena to the cape of Good Hope is about a month, from the cape of Good Hope to St. Helena, about eight or twelve days; from Ascension, eighteen days; and

from the coast of Africa, about Loanda, whence a vessel will generally fetch without a tack, in from ten to twelve days.

TRISTAN DA CUNHA GROUP.

The Tristan da Cunha group consists of three islands occupying a triangular-shaped area, of which the largest island, named after the discoverer, Tristan da Cunha, forms the NE. point, while the angles of the base to the SW. are formed by Inaccessible and Nightingale islands. The group appears to have been discovered by the Portuguese in their earlier navigations, and was farther explored and described by the Dutch in 1643 and by the French in 1767.

The island of Tristan, of circular form, is upward of 7 miles in diamater, and rises from the sea in the form of a truncated cone, at an angle of 45°, with a center peak, or dome, 7,640 feet above the sea, and may be seen from the distance of 75 miles. The island is steep-to all round, and, excepting on the north shore near the settlement where there is a comparatively low and grassy slope, the island is surrounded by a wall of inaccessible cliffs, from 1,000 to 2,000 feet high. The sides of the mountain mass as far as the central dome are covered with brushwood, intermixed with ferns and long grass; but higher up the mountain consists of bare, rugged rocks, frequently hidden by clouds, while the summit is covered with snow for the greater part of the year.

As this group lies in the track of outward-bound Indiamen, vessels not only have an opportunity in fine weather of visiting Tristan da Cunha and obtaining a variety of fresh supplies from this most remote and isolated settlement, but may also avail themselves of an excellent opportunity of verifying the accuracy of their chronometers, as the position of the NW. point of Tristan da Cunha island, as determined by Capt. Denham, R. N., is in latitude 37° 02′ 45″ S., longitude 12° 18′ 30″ W. It must, however, be borne in mind that great uncertainty of weather may be expected, and anchoring should never be attempted by any but steamers with their steam well under command.

The climate of the island is mild but moist, and experience has proved it to be peculiarly healthy, as the settlers have ever been remarkably free from disease. Seals, sea lions, and sea elephants abound on the shore, while whales are frequently observed in the offing. Of aquatic birds there are great varieties, including the albatross; but the only land birds are a species of thrush, bunting, and common moor hen. There are no reptiles and very few insects. Fish abound.

The following remarks are condensed from the notes of Capt. H. M. Denham, who visited the island in H. M. S. *Herald*, in November, 1852, and modified from the remarks made by the several officers of H. M. ships, who have visited the island since that date: "It was 2 p. m. be-

fore we approached the island sufficiently near to pick up a boat which we had observed to put off from the southwestern point. From the crew—fine, healthy, robust fellows—we learnt that the little settlement of nine families was situated on the NW. side of the island.

"We were now lying-to at 2½ miles from the stupendous cliffs, but not without anxiety lest the heavy swell should be accompanied by rollers while the ship should be in eddy winds, which twist a vessel round and round upon her heel, driving and drawing her under the cliffs where no bottom can be calculated upon for an anchor to avert destruction. Having regaled our visitors, who encouraged our project of landing, this being their finest (young summer) season, they left us, and we stood off for the night."

Landing.—"A NW. wind placed us rather to leeward of the settlement next morning and rendered the landing place a lee shore, but, looking for advice and assistance from our friends of last evening, we stood in. The first cast of the lead on approaching was 46 fathoms, sand, 1½ miles off shore, and abreast of the cottages on the tabled tongue of land immediately under the almost perpendicular side of the mountain, which slopes down on all sides to cliffs overhanging the sea, excepting on the flat space which forms the northwestern projection of the island.

"A heavy forbidding swell rolled us onward as we left the ship, and directed our boat toward the strip of dark pebbly shore, marked by the islanders' whaleboat, near the steep roadway which they have cut laterally with the cliff. This only clear spot, as respects boulders, can be hit upon by making for the beach about 200 yards length to the eastward of the cascade above the cliff, which varies in height along this shore from 10 to 100 feet above the sea.

"Keeping our eyes on the men on the beach close to their boat, we approached with confidence, looking to them for a sign, if we were wrong in attempting the surf, which, judging from the undulation we were in, was likely to break fearfully at their feet. But when within ⅛ mile of the shore, we entered the zone of kelp, or tangle, which girts the island at that distance, and once amid this tough seaweed, which grows up firmly rooted in 15 fathoms water, the crests of the swell are allayed, and the break on the beach becomes proportionately moderate.*

"Although a boat is necessarily less manageable from the obstruction which the weeds present to the oars, she would live a long time among it by making fast to the kelp, and riding between the outer waves and the beach surf.

* "The band of kelp weed had almost disappeared (probably depends on the season) which made landing more difficult. I should recommend the Sandy bay about 600 yards eastward of the waterfall for men-of-war boats in preference to the landing marked on the charts; the islanders prefer the latter spot."—Remarks of Capt. J. Fullerton, H. M. S. *Sapphire*, April, 1883. H. M. S. *Magiciene* found no difficulty in landing in 1890, during the 12 hours she lay off the island.

In our case we dashed in, as we were not beckoned away, and after shipping one sea, our boat was hauled up before she could ship another, with the assistance of the men who had accompanied the venerable governor (Glass) to the beach; thus guided by common care we effected a safe landing.

"The precarious weather which prevails at the island, to the exclusion of visitors at the risk of not regaining their ship for days together, would have prompted us to embark early in the afternoon, for we soon learnt that two successive days' steadiness of wind, weather, or swell could not be relied on. The weather on this occasion tempted us to prolong our visit until sunset for the purpose of learning as many particulars as possible concerning these isolated people, who, as a nucleus of English blood, language, customs, and church, claim our sympathy and protection."

Commander M. S. Nolloth, H. M. S. *Frolic*, in March 1856, remarks:

"The weather was fine during the four days we remained on the island, and there was little swell except near the beach, from which, owing to the unwieldiness of the cutter, there was some difficulty in launching her without danger. After three or four surfs a smooth of several minutes' duration always occurred, and in this interval the boat was hauled beyond the the heaviest surf to an anchor laid out by the whalers of the islanders who considered the cutter unfit for the work, stating that they would not have beckoned the boat to approach had they been aware of her weight. It is said that, excepting in the very worst weather, a landing with safety of life and generally to the boat, could always be effected somewhere under the lee of the island, there being, about a mile apart, small indentations with pebbly beaches in the steep cliffs which surround the island."

Capt. G. S. Nares, H. M. S. *Challenger*, in 1873, remarks: "Landing in Falmouth bay is easily effected, excepting with northerly winds and during the time of the rollers, when it is dangerous."

Anchorage.—Whalers and other vessels often visit this island, but nothing should induce the commander of a merchant vessel to anchor, even if the wind should be off shore, for the swell which attends the brief calm preceding the change of wind on shore (north and NW.) would probably snap the cable or jerk the anchor home and cause the ship to be drifted on the rocky shore. No merchant ship could work off, in the event of slipping a cable, and if the onshore wind proved a gale, the ship must part from or founder at her anchor. The *Julia* sloop of war was so caught, parted, and was totally wrecked with a fearful loss of life in 1818, but until her loss it was not known that the first warning of a northerly gale is a heavy surf setting in during a calm, and that even when the gale is at its height its force is not much felt at the settlement, as the velocity of the wind is decreased considerably by striking against the high perpendicular cliffs immediately to leeward of the anchorages. Southwest gales are severely felt at the settlement. But there would be no risk in

holding several days' communication by boats, the ship standing off and on, especially if the season happened to be between October and April, which is the summer period here.

The plan of the settlement bay, to which the residents have given the name of Falmouth bay, may be of service to ships desirous of correcting their longitude or to replenish water and stock; but it is dangerous to range along the margins of the island nearer than 2 miles, on account of the baffling eddies, which leave a ship on the on-set influence of its swell. Falmouth bay itself should not be approached within 1¼ miles, or in 40 fathoms water, a limit which is denoted by Hardy rock, being kept just open of Herald point, at the west end of Falmouth bay, and bearing S. 30° W. (S. 53° W. mag.).

With the above mark on, and the Black cliff—at the eastern end of a black pebbly beach—S. 31° E. (S. 8° E. mag.) is the best position for sending a boat on shore, while standing off and on or for anchoring, which may be done by a steamer with comparative impunity, providing the steam be kept well in hand.

It must not be forgotten, that excepting the absolute eddy extending ½ mile off shore, and produced by the projections of the island, the current sets to the northeastward.

General remarks.—The inhabitants of Tristan da Cunha are all English by association, though not by birth and parentage. The population (1852) amounted to eighty-five persons, all acknowledging the Church of England communion, and were under the pastoral care of the Rev. William Taylor, appointed by the Society for the Propagation of the Gospel, at the instance of an unknown benefactor who, sympathizing with the Tristan da Cunah people in their destitution regarding religious and moral instruction, had remitted to the society, in 1849, $5,000, to provide a resident clergyman, who would fulfill the offices of teacher and minister for five years.

The British government occupied this island by a detachment of artillery during the time Nepoleon was confined at St. Helena. On its being discontinued in 1821, one of the detachment, Corporal William Glass, and two seaman of the St. Helena squadron, obtained leave to remain on the island. The family of Glass, who was at once chosen chief, and habitually called governor, consists of wife, seven sons, and eight daughters; and what with the progeny of the two old men-of-war's men, and the settling of some four or five whaling men, and the marrying of the daughters of Glass and his first companions in this voluntary exile, the present population amounts, as stated, to eighty-five.

The young men and women partake of the mulatto caste, as the wives of the first settlers, Glass, etc., were natives of the cape of Good Hope and St. Helena, but the children of the second generation are what we should term handsome brunettes, of a strikingly fine figure. It is asserted

that a healthier place than this island can not be found; that none of the epidemical diseases have reached them, and the little ones are not subjected to any complaints or illness common to children. The clergyman assured us that he had not traced a vice to contend with.

The following information is condensed from the reports of Commander Nolloth:

"The *Frolic* sighted the island on March 16, 1856, all but a small portion being enveloped in cloud, but fresh breezes from NW. and SE. prevented any attempt being made to communicate until noon of the 18th, when Commander Nolloth landed with some degree of risk in the cutter, the settlers pointing out the exact spot to steer for, and afterwards, with the assistance of some bullocks, dragged the boat up the steep beach of lava pebbles beyond the reach of all but unusually heavy rollers. The islanders were found to be well and without need of immediate assistance. At the time of the *Frolic's* visit the inhabitants on the island, including the Rev. W. Taylor, amounted to 71, their numbers having lately been reduced by the departure in the previous January of Mrs. Glass, wife of the late governor, with the children of the first and second generations, in all 25 persons. The late Corporal Glass, who was always spoken of as 'the Governor,' was a native of Kelso, and died in November, 1853, at the age of sixty-seven, after a residence on the island of thirty-nine years. He was evidently much respected, and was by common consent esteemed as the patriarch of the community, being, until the arrival of the Rev. W. Taylor, their priest as well as their chief. He is buried in front of the settlement of which he was founder, and his grave is marked by a marble tablet with an appropriate inscription sent by his sons from their new home in the United States."*

The area of ground fit for tillage was very limited and the soil easily exhausted; it was very seldom that an attempt was made to raise a second crop from the same plot, for the ground required considerable manuring after having been once used, and it was found more profitable to clear fresh ground each time. The potato was the only crop which flourished, but the high winds of spring and a grub which makes its appearance in prodigious numbers during autumn were very destructive to this root, on which the islanders chiefly depended for food, and for the various necessaries they received in exchange from American whalers, whose visits would cease with the failure of this supply. The introduction of the potato disease, to prevent which every possible care was taken, would almost reduce the people to a state of starvation.

* In 1857, H. M. S. *Geyser*, on behalf of the government, visited the island and removed forty-five of the inhabitants, together with Mr. Taylor, who had fulfilled his term of five years as resident clergyman; and about the same time five families went to the United States.

The island contained about 200 head of grown cattle and about 300 sheep and pigs, besides poultry, etc.* At the time of Commander Nolloth's visit there was an abundance of wood, but for some years past it had been diminishing both in quality and quantity, owing to decay caused by a disease which first became apparent about seven years previously. The visits of the whalers were gradually becoming less frequent, which increased the difficulty of obtaining clothing and other absolute necessaries. The islanders considered that 200 was the maximum number of persons for whom subsistence could be procured with any degree of comfort.

The ascent of the peak was considered easy by the goat-footed islanders; it is said to terminate in a cone, consisting of black and deep-red lava ashes, in the center of which is an extinct crater nearly circular, ¼ mile in diameter, and partly filled with fresh water, but its depth was unknown. No ancient lava streams are visible nor any signs of former sea levels; no corals or shells have been found, and there are no thermal waters. The only indication of volcanic activity during the residence of the late Governor Glass, was a slight shock of earthquake about seven years previous to the *Frolic's* visit, when a portion of rock was precipitated from the mountain side, and motion imparted to articles of furniture. Several persons heard a noise at the time of the occurrence, though the day was fine, and not in the thunder season.

Specimens of many varieties of ferns were collected, and a plant which yields a beverage preferred by some of the islanders to tea, and which invariably springs up after a crop of potatoes; also a plant with red berries, somewhat resembling in taste insipid cranberries, of which a preserve is made. All the Cape sea birds visit this and the adjacent islands and flock in great numbers from all parts of the horizon to roost on the heights after dark. The eggs are at times in great abundance and the islanders collect them periodically.

The island of Tristan da Cunha was also visited on Christmas day, 1857, by H.M.S. *Cyclops*, Capt. W. J. S. Pullen, who was deputed by the government to present a boat, and stores of various kinds to the islanders as an acknowledgment of the services rendered by them to distressed British subjects. At the time of her visit the inhabitants consisted of only thirty-five souls, all of whom were in good health, and appeared much amused to find a medicine chest amongst the stores. The men were dressed in blue dungaree and the women in printed cottons, which they obtain from American whalers in exchange for farm produce; the same description of dress answers throughout the year, as the fluctuations of temperature are very small.

*In December, 1890, there were 500 head of cattle and 300 sheep, besides a great number of pigs and poultry.

The following information is derived from an interesting account of the visit, published in "Cruise of H. M. S. *Galatea*."

The *Galatea* sighted the island on Sunday, August 4, 1867, when at a distance of 55 miles, the snow-clad summit being at first mistaken for a small white cloud, the remaining portion being entirely hidden from view by a light haze. On the morning of August 5 the ship was boarded by the island boat, and the Duke of Edinburgh with his suite and a number of officers left the ship in two cutters. The *Galatea* was only about 1¼ miles off the settlement, but the swell was so great that occasionally, as the boat went down into the trough of the sea, the ship was entirely hidden from view. Landing was, however, safely effected, but not without some sustaining a good wetting by a roller breaking over the stern of one of the boats.

The settlement consisted of eleven houses, with a small portion of land inclosed by loose stone walls attached to each, but the gardens had very little growing in them, as it was early spring. Peter Green appeared to be the chief of the little colony, not by election, but by general recognition, in consequence of his being the oldest man and longest in the colony; his residence extends over a period of thirty-one years.

H. M. S. *Thalia* visited the island in August, 1886, and landed the Rev. E. H. Dodgson, with a supply of provisions, clothing, and other necessaries. The population numbered at that time 97, or nearly the same as in 1883.

The more recent visit was that of H. M. S. *Curacoa*, December 11, 1888, with supplies for the island; a whaleboat was also given to them. Landing was easily effected. The vessel removed three men and five women to Cape Town, the number remaining being 72.

H. M. S. *Raleigh* visited the island in February, 1892, when there were 13 men, 20 women, and 17 children, a total of 50. In March, 1893, there were a total of 53.

Landing.—Light whaleboats should be used in landing; these boats can land stores from the heavier boats. The best landing is on the sandy beach eastward of Malcolm point. With the wind northward of west, landing is not practicable near the waterfall. The best season for landing is about November and December.

Disease.—The island was found to be remarkably healthy, but it is stated as a singular fact that any vessel touching there from St. Helena invariably brings with her a disease resembling influenza. It is equally remarkable that St. Kilda is similarly afflicted, and on this subject Capt. Otter, R. N., in his description of that island, remarks: "In a description given by Pennant, a circumstance is stated which has been doubted, viz, that whenever a vessel communicates with the island, its inhabitants are affected shortly after with a distressing cold in the head; this was verified

on the first visit of H. M. S. *Porcupine*, but since a more frequent communication has taken place this remarkable epidemic has been modified."

Supplies.—There were about 450 cattle, 200 sheep, and plenty of fowls and geese on Tristan island in 1893. A large quantity of potatoes are grown, but no grain. Abundance of fish may be caught by hook and line.

Fish.—In addition to seals and sea elephants, the island is frequented by salmon, mackerel, a large kind of mullet, a species of bass, and other fish. The blue shark abounds and the islanders in consequence deem it unsafe to bathe in the sea. The sperm, the black, and the right whales are occasionally seen all the year round; and the height of the whaling season appears to be from September to January inclusive. The two former seldom approach within 10 or 12 miles of the shore; but the right whale frequently ventures close in. There are no fresh water fish on the island.

Wood and water.—Firewood is scarce, but water plentiful, being supplied from a spring at the back of the settlement, and thence tumbling over the cliffs 15 to 20 feet, forms a miniature waterfall, marked on the chart. Ships may obtain water with their own boats by lying outside the surf and filling the casks with a hose connected with the waterfall. The assistance of the islanders may always be relied on.

Tides.—It is high water, full and change, in Falmouth bay, at 12h.; tide rises from 4 to 6 feet.

Current.—The current, according to the statement of the islanders, generally sets to the NE. (excepting close in shore, where there is a slight drain to the SW.) but occasionally it changes to the opposite direction.

Weather.—No meteorological register has been kept on the island except during the four months' stay of Lieut. Rice (August to November) in 1816, which from observations taken for a period of 105 days gave the following results: Mean temperature, 55° to 58°; extreme range, 82° to 43°; rain fell on 72 days (25 days in September); and landing was safe on 63 days; gales or strong winds blew on 45 days; SW. winds on 39; NW. and west winds, 29 days; but from information derived from Mr. Taylor, the clergyman who resided on the island five years, it would appear that the thermometer generally stands at 68° in the summer, and at 58° in the winter; and that even during the night he had never known it to fall below 40°. Very thin ice was, however, occasionally found in winter, and in the depth of this season, in June, July, August, and September, the summit of the mountain was almost covered with snow, and occassionally at other seasons of the year for days together. Snow and hail was sometimes, but very seldom, experienced on the low land of the settlement.

The prevailing winds throughout the year are from the northward of west; the southern summer being distinguished by more frequent south-westerly winds than the winter season. August and September are the worst months, when the heaviest gales generally commence at NE., and then backing round to NW. continue to increase, until still veering against the sun, the storm reaches its height from the SW. quarter, and blows furiously for days together, while the opposite swells caused by the various winds create a heavy confused sea as far as the eye can reach. From December to March inclusive is the finest season, but the weather is uncertain at all times, especially when the wind is at east. The heaviest gale within the experience of the inhabitants occurred in October, 1855, when a few hours' longer duration would, it was supposed, have reduced their houses to ruins. The weather is generally the finest and most reliable when the wind has most westing.

Staff Commander T. H. Tizard, H. M. S. *Challenger*, 1873, observes in his account of T. istan island: "During our four days' stay (October), the wind varied from NW. through west and south to SE., the force never exceeded 5, and being frequently one. The weather was cloudy and the sea moderate. The temperature of the surface water was on an average from 2° to 3° higher than the air, the maximum temperature in the shade registered being 56°, the minimum 46°, and the mean 51°, while the mean temperature of the surface water was 53°.6. The air was dry and invigorating, the relative humidity averaging 77°."

Rollers.—The following information respecting the rollers, which are occasionally experienced here as well as on the other islands in the South Atlantic, is derived from the islanders themselves, but unfortunately no register of the date of the actual occurrence of them has been kept. The rollers do not seem to be affected by lunar influences, but set in at all times during winds and calms; in the latter case they are always heavier. The heaviest rollers occur from December to February, three of the finest months, when they sometimes last three or four days, and this remark, according to the account of whalers, also applies to Gough and other islands in the southern hemisphere; but they are more frequent during the winter months.

Inaccessible island.—This island, which was partially surveyed by the officers of H. M. S. *Challenger* in 1873, who landed on the island, is about 3 miles in length, and lies 20½ miles S. 57° W. (S. 80° W. mag.) from Tristan da Cunha island, and presents a high mass of rock with a tabled summit. The island is in shape nearly square, its sides being about 2 miles long, and the direction of its diameters being about north and south, and east and west. The highest peak on the island is 1,840 feet above the level of the sea, and is situated on the west side of the island; the land thence slopes irregularly, terminating on all sides in precipitous cliffs,

about 1,100 feet above the sea. On the south point of the island is a remarkable rocky conical hill, 1,140 feet high, and 1,200 yards westward of this is another rocky cone 690 feet high. The NW. coast is low, and the cliffs there recede sufficiently to allow the summit of the island to be gained with some difficulty. On the NE. side of the island the shore is also low, and there are two waterfalls, the southern one being the largest and most conspicuous.

Landing.—There is good landing near the southern waterfall, but the cliffs are precipitous, and it is impossible to proceed beyond the narrow strip of coast bordering the cliffs.

On the SE. and SW. sides of the island the cliffs rise abruptly from the sea, and here the island appears to be literally inaccessible.

Southward of the east point of the island there is a rock 3 feet high, 200 yards from the shore. Off the south point are two rocks, one a pyramid 60 feet high with a rock awash about ⅓ mile westward of it, the other a low rock 3 feet high close east of Pyramid rock. Off the SW. side are two rocks awash ½ mile from the shore, and off the NE. side is a rock 2 feet high 200 yards from the shore.

Soundings of 50 to 90 fathoms were obtained at 1½ miles from the shore on all sides of the island. Kelp grows on the NE. side in a depth of 12 fathoms at ¼ to ½ mile from the shore.

Anchorage may be found just outside the kelp in 15 fathoms, abreast of the 2-foot rock, but this anchorage should be used with caution, as the survey of the island is not complete.

Supplies.—Pigs are to be found on the irregular ground above the cliffs, but as the animals feed on sea birds' eggs their flesh is fishy and unpalatable. Fish are abundant, and may be readily caught by hook and line.

Remarks.—Two Germans were taken off Inaccessible island by H. M. S. *Challenger*, having lived there two years and undergone great privations. The penguins, they state, make their appearance at Inaccessible island in the month of June and soon afterwards begin to lay their eggs. The birds disappear for a short time in January after the eggs are hatched and the young are ready for the sea, and then come back to moult, finally leaving the island in April.

On July 23, 1821, the ship *Blenden Hall*, from London to Bombay, was totally lost on Inaccessible island during a dense fog, when two of the crew perished, but the remainder with all the passengers got safely on shore, where, exposed to cold and rain, they remained several months, their only means of subsistence being penguins and their eggs. On October 19, eight of the crew attempted to reach Tristan da Cunha in a boat rudely constructed from the remains of the wreck, but they were never heard of again.

On November 8, another boat was despatched and succeeded in reaching that island in a sinking state, when Governor Glass took immediate measures to succor the unfortunate people, and by dint of great perseverance and at great risk succeeded in removing, by means of the island whaleboats, the whole of the survivors to Tristan da Cunha island, where they were treated with the greatest kindness by the settlers until their departure for the cape of Good Hope in an English brig, January 9 following. Governor Glass afterwards conveyed to Inaccessible island live stock, which have now greatly increased, as provision for future contingencies.

Nightingale islands, a group of three, and lying S. 26° W. (S. 49° W. mag.) about 20 miles from Tristan da Cunha, and S. 57° E. (S. 34° E. mag.), 11 miles from Inaccessible island, were partially surveyed by the officers of H. M. S. *Challenger*, 1873. The group consists of one large and two small islands, with several rocks close to their coasts, but there is apparently no outlying danger. The large island is one mile long east and west and ⅝ mile wide, and has two peaks, the eastern one of which is rugged and precipitous, 1,105 feet high, and appears conical on a NNE. and SSW. bearing. The other, 960 feet, slopes gently on all but its south side.

Stoltenhoff island, which is the most northern, lies 1,600 yards from the main island, and is a flat-topped precipitous rock 800 yards long, 300 yards broad, and 325 feet high, formed in one large and two small pieces by narrow chasms, which can only be distinguished on one bearing.

Middle island is 600 yards long, 400 yards broad, and 150 feet high. There is a channel between it and Stoltenhoff ¼ mile wide, which appears to be deep, and another channel between Middle and the main island 300 yards wide wholly blocked up with detached rocks. Off the NW. side of Middle island is a remarkable pin rock about 30 feet high.

The coast of Nightingale island is precipitous on all but the NE. side, and is cut into deep recesses and caves which are visited by seals and sea elephants at the birth of their young.

Kelp extends ¼ mile from the east side of the islands, but there is little or none on the south or west sides, which are the most exposed.

Soundings from 50 to 200 fathoms, coral, were found at about one mile from the above. A few sunken rocks border the south shore, but they are readily seen.

Landing.—There is no beach of any kind, but an easy landing can be effected on the rocks at the NE. point of Nightingale island.

Water.—Fresh water may be obtained in a cove close to the landing place.

Remarks.—There are neither pigs nor goats on Nightingale island. During the breeding season of the penguins, from August to November, it is difficult to walk on the islands, the birds and their nests occupying almost every inch of the damp ground between the tussack grass, 8 or 9 feet high, which overruns the islands.

Inaccessible and Nightingale islands have been visited, though very rarely, by the settlers of Tristan da Cunha for seals and sea elephants, which, being undisturbed, are more numerous. Both islands have fresh water in their crater-formed summits, that of Inaccessible island being larger than the one on Tristan da Cunha. The soil of Nightingale island is by their account impregnated with alum or some such substance, which renders the water undrinkable, except that from the lake, which is pure.

Gough Island.

Gough island derives its name from Capt. Gough, who sighted it in 1731, in the ship *Richmond* on her voyage to China; but there is reason to suppose that the original discoverers were the Portuguese.

The island, 4,380 feet above the sea, is about 8 miles in length by about 4 in breadth, with precipitous cliffs on its northern and western sides; these attain a height of about 1,000 feet near North point, decreasing gradually toward the south end of the island to about 100 or 200 feet. On the eastern side there is a rocky beach 1½ miles in length, unbacked by cliff, from which a valley offers apparently the only accessible way into the interior. The lower parts of the island are covered with coarse tufted grass and small brushwood. Some trees grow on the higher part. The southern slopes appear fertile, but the northern end is rocky and barren. The shores are fringed with kelp, though not thickly. Penguin and other sea birds abound, but no other animal life. Water in plenty runs down the cliffs in cascades, except at the southern end.

Position.—The position of Penguin islet, on the east side of Gough, is found to be in latitude 40° 19′ 15″ S., longitude 9° 56′ 30″ W., or 12½ miles of longitude further west than originally charted.

Anchorage.—The island may be approached to within about one mile, except off its NW. point, where a reef, which breaks heavily, extends to about that distance. The island is apparently steep-to on all except its eastern side, where depths of about 20 fathoms are found at from ½ to ¾ mile off shore. Here temporary anchorage (keeping steam up) might be taken, choosing the position according to the direction of the wind. A good position appears to be just northward of Penguin islet, abreast a cove, where there is a depth of 17 fathoms, soft sand, with the islet in line with the SE. point.

Landing has been effected off the rocky beach abreast the valley before mentioned. Capt. Heywood landed at a cove on the north side just eastward of one of the islets, probably the one marked Lot's wife. Landing can also be effected easily in the cove between Church rock (so called from its resemblance to a church with a high spire on its western end) and Penguin islet, protected by the NE. point; but the best position for landing will obviously depend on the direction of the wind and swell around the island at the time.

CHAPTER XV.

CAPE LOPEZ TO THE KONGO RIVER.

Lopez island, of which cape Lopez forms the nothern extremity, is separated from the continent by the Lopez river, which flows into the bay of the same name; and also by the Mexias river, which joins the sea on the south side of the island 21 miles southward of the cape; the intervening shore being sandy and without offlying dangers.

The river system of the region in the immediate vicinity of cape Lopez was explored by M. Du Chaillu, who found that the rivers Nazareth, Mexias, and Fernan Vaz are the branches of the great arterial river Ogowe, and not distinct rivers as was previously understood; these streams form with the intervening lowlands, which are evidently alluvial deposits, an entensive and very complicated network of creeks, swamps, and dense forests, which are in fact the delta of the parent river.

Cape Lopez.—The former extreme of the cape is now under water, forming a spit on which there is a depth of 2 fathoms at 1½ miles or more from the mangroves. It was on this spot the *Loiret* struck in 1876. As it is a matter of extreme difficulty to judge the distance from this point when rounding it, it should be given a wide berth. Strong eddies and discolored water exist in the neighborhood of the spit.

Current.—Off cape Lopez, at a distance of from 10 to 20 miles, a current setting SW. at a rate of nearly ¾ mile an hour has been experienced. At 2 miles from the cape the current has been found as much as 2 miles an hour setting SW.

The coast.—From cape Lopez the coast trends SSE. for 88 miles to cape St. Catherine; it is clear the whole distance, and may be approached to a distance of 2 miles in 6 or 7 fathoms. Southward of Fernan Vaz the isolated groups of trees become larger, and form a considerable forest toward cape St. Catherine, where between the river and the sea is the inhospitable jungle which forms the principal home of the gorilla.

Mexias river.—The Mexias or Animba river empties into the sea south of Lopez island; its actual mouth, which is very narrow and apparently impracticable, is between the south extremity of the island and the Adjuri bank, a sand spit running parallel to the land for 8 miles. The lands eastward of this bank are much cut up by numerous streams, not yet care-

fully explored, but in about 1° 2′ S., eastward of the point where the spit commences, and on which stands the village of Ntyale; the Mexias river is navigable, and receives the Nango Nangé river by means of which the Ogowe is reached; father eastward are several rivers, all navigable and communicating with Fernan Vaz river. Anchorage may be obtained off the entrance of Mexias river, but care must be taken to avoid a reef which extends from the south point, half way across the channel.

Fernan Vaz river.—This river flows into the sea through a narrow mouth between the points of two mangrove covered islands, in latitude about 1° 21′ S., and when seen from seaward shows four breaks in its line of trees; it is the southern outlet of the Ogowe river, and of its confluent the Rembo river, which runs nearly parallel to the coast for a distance of 25 miles. The sand banks at the entrance of the Fernan Vaz are so constantly shifting as to render any specific directions entirely useless, and the channel, which generally preserves a depth of 2½ and 3 fathoms, is invariably intricate.

This river and the Mexias throw into the ocean during the rainy season a vast quantity of fresh water, which forces its way through the sea for a distance of 4 or 5 miles before it becomes absorbed; and at times the flood tide has no perceptible effect on the rapid current.

Bar.—The position of the mouth of the channel in December, 1879, was fully 2½ miles northward of the Pilot village, with a tongue of sand extending about 3 miles from the southern point. The bar appeared absolutely impracticable as the surf was breaking violently over its entire length. The depths of water about 1½ miles outside and parallel with the bar were not less than 26 feet.

Anchorage.—The southern point of the Fernan Vaz, abreast of which vessels should anchor, is unmistakeable, from the lofty trees with white trunks which grow close to the water's edge.

Communication with the shore is dangerous for boats, as the waters are infested with sharks, but vessels wishing to do so can generally land in canoes abreast of the factories and customhouse on South point.

Pilots for the bar can be obtained at the Customhouse village.

Trade.—There is a considerable trade carried on here in ivory, India rubber, and ebony.

Factories.—There is an English factory on Dame island, at the mouth of the Agulé river about 10 miles within Fernan Vaz river. Vessels of 6 feet draft can navigate the Agulé at all seasons.

The Agulé is from 230 to 160 feet in breadth and is comparatively free from dangers. The stream always runs down, but as far as the influence of the flood tide is felt, the strength of the stream is proportionally affected.

Balé island at the entrance to lake N'Chonguen Chiné, is highly cultivated. All kinds of provisions may be obtained here, and the lake abounds

in fish. Good anchorage, muddy bottom, 13 feet water, may be had northward of Balé island.

Ningue Sika island, on which is an English factory, lies apparently north of Balé island. It is surrounded by an extensive muddy sand bank, through which a single and winding channel, without any marks, leads to within ½ mile of the south extremity of the island. Pilots may be obtained here for the Rembo river, the navigation of which is difficult; the current runs from 3 to 4 miles an hour in the rainy season. There is an English factory on the Rembo, near the entrance to lake Nimbé, which is nothing more than a great marsh, 2½ miles long and one mile broad.

Duke town.—In a bay about 10 miles southward of the river Fernan Vaz, is Duke town, consisting of a few large huts, behind which the Fernan Vaz may be traced, the trees on the near side of the river showing in dark relief against the distant ones on the further side.

Cama bay.—About 21 miles southward of Fernan Vaz river is Metuton point, the north extremity of Cama bay, into which flows three rivers, one of which of small size, but with a heavy surf on its bar, in latitude 1° 47′ S., is known as the Cama river, and gives its name to the bay. Metuton point, which is well wooded, and has on its northern side the small river Paraidia, is distant 11 miles from cape St. Catherine. The Cama river, as well as the other streams in the bay, are, in fact, so many outlets of Rembo river.

In Cama bay the trees extend down to the water's edge; several villages are to be seen, and about 2 miles north of Cama river is the village of Egnaga.

Anchorage.—The entrance to Cama river is easily made out, and good anchorage obtained nearly 3 miles off in 6½ fathoms, but even this position is too close to the shore when the swell is heavy, and the undulations approach the character of rollers; indeed, as a rule, vessels along this shore should not anchor within the 7-fathom line.

It may be useful to know that the natives along this part of the coast often call the rivers Fernan Vaz, Cama, and Settée, indiscriminately by the name Cama.

Cape St. Catherine forms only a slight projection from the usual coast line, with a reef extending northward, on which the sea breaks heavily; a vessel running down this coast should not approach the point nearer than 4 miles. When coming from northward the point appears like an isolated clump of lofty trees; but from southward the shore assumes a craggy appearance.

Some hills of slight elevation southward of the point give the shore a bold appearance. Above the beach the land rises gently and shows a few clearings, with a little vegetation, giving the country a cultivated aspect, which continues more or less as far as Kabenda.

Engui (Iguela) is the name of a collection of factories erected close to the shore, which are very conspicuous from the sea; they are situated nearly midway between Settée point and cape St. Catherine. The factories of Iguela are 2 miles in shore; their flags can be seen through an opening in the trees when bearing about NE.

The coast.—From cape St. Catherine the land trends SE. by S., 32 miles to Settée point. Between cape Lopez and this point the coast is thinly inhabited; as far as the Fernan Vaz it is thickly wooded, but farther south the appearance of the land is more varied, displaying small extents of narrow beach and intervals of trees growing to the water's edge; the shore curves slightly, and numerous streams are seen through narrow openings in the trees, principally to the north of the Settée river, where the beach reappears. Quite high hills are seen in the interior, forming a chain parallel to the beach; from the masthead land can be seen when the vessel is in 35 fathoms, which would be about 18 or 20 miles off shore. Along the whole distance the surf is very heavy, except in a few places where boats may land on exceptionally smooth days. One of these is at the mouth of the Cama, and another at the entrance of the Settée. There is a cluster of huts called Capota in latitude 2° 15′ S., and two large villages close to the mouth of the Settée river.

Settée river.—From Settée point to Pedras point the coast line trends SE. 30 miles, and just within the former point, is the Settée river, the northern boundary of the kingdom of Loango. It is a fine stream 1½ miles broad between its extreme points, which are low and covered with high trees, thus rendering the place difficult to distinguish. The river has a depth of 3 fathoms at its entrance, near which it separates into two streams, the one running to the north and the other, the principal branch, toward the east; the stream runs out at an acute angle with the line of coast; it is marked by a long spit of sand, but is invisible from the masthead at a distance of 2 miles; the current runs strongly out, and there is too much surf for a ship's boat to cross the bar.

The entrance channel is ⅔ mile broad, being formed on the north by a wooded bank and on the south by the sandy spit alluded to, which, after stretching westward for about a mile beyond the south point of the river, continues round the southern point at a short distance, and extends itself up the river. The Settée river rises in the mountains of Camplida, and is said to be 260 miles long.

On the right bank of the river, 50 miles from the coast, is situated the town of Settée, the Capital of the territory of the same name; the inhabitants formerly carried on an extensive trade with the Portuguese on the coast and the countries inland, which abound in barwood and ivory.

Factories.—There are four factories at Settée Cama, rather distant from

one another upon a low beach; they stand out clearly against the dark background of a cluster of large trees.

Landing is generally difficult and should never be attempted, except in bar canoes.

Anchorage is a long way from shore and bad; there is always a heavy swell.

Signals.—The German factory (second from the north) has the international code.

Wreck.—At the entrance of the river and near the land is the wreck of a German steamer, which was sunk in 1883; the funnel and masts were still visible in 1889.

Reported shoals.—A shoal with 10 feet water on it, and from 30 to 33 feet around it has been reported to exist at one mile westward of Settée point, with other shoals 2 miles to the southward, and at the same distance from the shore. These shoals are dangerous to vessels coming from the south.

Coast.—South of the Settée river the coast continues low and wooded, and trends SE. for 15 miles, where the chain of Santo Espirito hills begin, which are the best marks for recognizing the Settée river and Pedras point, the latter being 9 miles south.

The Santo Espirito hills, situated a few miles in the interior, form two remarkable patches of table-land, separated by a valley, through which a stream appears to run; from the summits the land descends by a gentle and regular slope, and on the sides spots are seen apparently covered with grass; but on closing the coast to soundings of 10 or 11 fathoms they are quite barren. Vessels should not anchor along this coast in less than 8 or 9 fathoms, which will be found about 3 miles off. Within these depths the bottom is foul and rocky, with many sharp crests. Fish are very plenty. To the south of the Santo Espirito hills there may be seen, when near the shore in 10 or 11 fathoms, large clearings, which give to the country the appearance of being cultivated.

Winds and currents.—The prevailing wind along this coast is SW., with a little variation toward the east in the morning; but during May the wind blows steadily along the coast from south and S. by E. night and day, and a current may be expected setting north at the rate of one mile an hour. At rare and uncertain intervals the current has been known to change and run south for a day or two.

Pedras point is wooded and difficult to identify from seaward, though it is more distinct from the southward. It projects about a mile beyond the line of coast which forms the right bank of a river which first trends NE., and afterward turning sharply SE. rounds the south end of Santo Espirito hills. A bank of rocks and sand extends off the point for a distance of 2 miles in a southwesterly direction, and there are also said to be

sand banks off its northern side, and to this circumstance the point probably owes its name. Vessels should give this point a wide berth, as it has apparently only been partially examined.

Factory.—There is an English factory in the small bay about a mile northward of the point, and anchorage can be had off it in about 7 fathoms, sand, but in approaching the soundings will be found very irregular. The landing is bad, the canoes often upsetting.

The coast.—From Pedras point to cape Mayumba the distance is 53 miles in a SE. direction, and the intervening shore presents a varied aspect. The shore is bordered by a narrow sandy beach, visible about 5 miles off, and within the beach there rises a dense line of tall mangroves. In many places the land appears in three ranges; first the shore mangroves, then taller trees inland, and beyond in the interior a lofty range of hills with rounded summits.

In about latitude 3° South, 33 miles south of Pedras point, there is a customhouse at a place called N'Yango.

Cape Mayumba.—The shore gradually rises on nearing cape Mayumba, which from the north shows itself in three or four high saddle hills, falling steep down to the sea to a small cliff of a deep red color at the pitch of the cape, on whose summit are several clusters of trees. The cape is in latitude 3° 14′ S., and the hills alluded to are known as the highland of Yumba. Yumba is the proper name of the province in which the bay is situated, and not Ma-yumba, which signifies the King of Yumba. It has, however, been deemed expedient to retain the old name, by which the locality has been long known.

From the pitch of the cape a rocky ledge extends one mile SW., and 5 miles off shore there are 13 fathoms, sand and gravel. At the foot of the high ground of the cape is a rock or small islet joining the land, to the south of which is a creek where landing may be effected, and a little further south the Yumba flows into the sea; it waters the Yumba province of the Loango kingdom, and is said to be 100 miles in length.

Mayumba bay is 10½ miles across between cape Mayumba and Matuti point, 2 miles in depth, forming a curve, with a fine sandy beach. Hills rise from its shore to a moderate height and are well wooded, especially to the south, while to the east of Matuti point is a wooded hill, at the foot of which the Matambi river, after running parallel with the shore for several miles, empties into the sea about 2 miles NE. of Matuti point, which may be recognized by its rising into a hill.

The entrance to this river is narrow and barred by rocks, on which at low water there is only about 8 feet; the channel is not always passable for boats. A short distance from the shore the river opens out into a large basin filled with shoals and islands, into which several other rivers flow. By landing on the beach about 1½ miles from Matuti point the

river may be reached, as the distance from the beach does not exceed 200 yards, and a light boat or canoe may be carried over and launched into the stream, where the seine may be used to advantage; outside, the surf is too heavy for seine hauling.

Reef.—Off Matuti point a reef of rocks, some of which are above water, extend 400 yards, and about 1,200 yards from the point N. 39° W. (N. 22° W. mag.), is the outer of two small islets, surrounded by a reef 600 yards in extent. Between this reef and the point there is a deep passage 600 yards broad, but it is not advisable to use it, as there are no leading marks.

During the prevalence of fogs in June, July, and August, vessels may take advantage of the bank of soundings which extends along the coast from Settée Cama to Mayumba bay, and anchor on it.

Mayumba bay may be considered the southern limit of great rain. South of this bay the vegetation is less vigorous, and arid plains and naked hills begin to appear; the coast presents evident signs of drought more or less intense, and these characteristics become more apparent on going south.

Factories.—There are two English factories to the north, and to the south a German factory which consists of two houses with a flagstaff between them. The French station is between these; it is a European house with a white roof.

Landing.—Ships' boats can land at times on Mayumba beach.

Resources.—There are several villages among the trees near Matuti point; the principal one contains about 1,000 people; provisions can be obtained, but only in small quantities, unless two or three days' time can be given to obtain them from the interior. The bay abounds in fish, especially shellfish; these, with yams, form the principal food of the inhabitants, who are very poor. Trade is carried on in ivory, dyewoods, wax, and gum.

Tides.—It is high water, full and change, in Mayumba bay at 4h. 35m.; springs rise 7 feet.

Directions.—In coming from the northward, it will be requisite to pass at least 2 miles off cape Mayumba, and in coming from the southward give Matuti point a good berth and pass outside the islets. The best anchorage for vessels of large draft is with the islets in line S. 39° W. (S. 56° W. mag.) in 6 or 7 fathoms, mud; this position will be about $\frac{1}{2}$ mile from the inner islet, and the same distance from the shore. Ships may anchor on the line between the points of Mayumba bay, in depths varying from 8 to 10 fathoms, brown sand.

Mayumba bay affords good shelter from south and SSE. winds, but it is exposed to winds from SW., although in the position mentioned the reefs around the islets break the sea and lessen the effect of the swell which

generally prevails in the bay, but especially so with the wind on shore. There is anchorage in about 4 fathoms, between Matuti point and the northeastern islet, where vessels may lie more sheltered; but along this coast such shallow water is always objectionable as an anchorage, on account of rollers setting in.

Black rocks.—About 6 miles southward of Matuti point and about 50 yards from the beach is a black rock about 5 feet above water, and about 3 miles further on is a small islet, or large black rock, about 400 yards off shore; these rocks are based on a bank which extends off shore about ½ mile.

Banda point (Segundo cape).—From Matuti point to Banda point, the first projecting land to the southward, the distance is 37 miles in a SE. by S. direction; and between these points the sandy nature of the land gradually increases, with trees skirting the base of the hillocks. On Banda point, which is low, is a large village, and the locality may be recognized by two lofty hills in the background in the third range, the summits of which, from their form, are known as the Paps of Banda.

The bottom near Banda point is thickly studded with rocks and coral reefs, which extend 4½ miles to the NW., at which distance there is a depth of 20 fathoms. Plenty of fish can be obtained, but the anchorage is bad, and a good offing should be preserved on account of the irregular nature of the rocks.

Antelope shoal.—At the distance of one mile southwestward of Banda point is Antelope shoal, with 2½ fathoms water, on which the sea frequently breaks.

Makanda and Kilongo rivers.—From Banda point to Kilongo point the distance is 29 miles in a SE. direction; and between these points the coast, which is moderately high and wooded at its base, falls back and forms a slight indentation. Several rivers flow into the sea between the points, one of which is the Makanda river, 17 miles from Banda point, with a village of the same name on its left bank, about 3 miles from the sea; this river forms the southern boundary of the Yumba territory. The southernmost stream is the Kilongo river, about 2 miles north of Kilongo point, and is said to be 30 miles long.

Kilongo point is low and marked by a single hill with a flat top; off the point extends a reef, varying, according to different authorities, from ½ mile to 2 miles off shore, and having from one to 2 fathoms of water; there is moderately good anchorage in 4½ fathoms, red sand and shells, northward of the reef in the cove abreast Kilongo river. The town of Kilongo is about 4 miles from the entrance on the left bank in the midst of a park like country.

Prometheus shoal.—The northern portion of this shoal on which the sea at times breaks heavily, lies 6 miles northward of Kilongo point, in

latitude 4° 10′ S. and about 3 or 4 miles off shore; it was discovered in 1845 by H. M. S. *Prometheus* suddenly shoaling from 7 to 3¼ fathoms on the outer edge of the shoal. The following year Commander Hay of the same ship remarks as follows:

"Whilst steaming to the anchorage off Kilongo river to examine a vessel lying there, and considering ourselves to be 2 or 3 miles south of where we had formerly found shoal water, and whilst keeping in regular soundings of 6 fathoms, about 4 miles off shore, we touched the ground in 3 fathoms hard bottom, but went off at once without injury. On putting the helm hard astarboard, we touched again, but this time on soft bottom, and in few minutes we were clear of the swell and shoal water. Our draft of water at this time did not exceed 12 feet. As I had not time to examine the shoal, I do not know its direction or where the passage is inside it; but there must be one, as the brigantine we chased was lying close in."

Mr. H. Bond, Master, H. M. S. *Conflict*, in 1859, observes: "The Prometheus shoal is increasing to the southward, and I have seen the sea break over it with one continued line of surf to Kilongo river south point. There is not more than 6 feet water on the shoal in some places, and it should not be approached nearer than 8 fathoms, as it shoals very suddenly, and in calm weather there is no surf or rollers to give warning. I should recommend strangers when running up or down this part of the coast not to approach the shore in less than 9 fathoms until they get to northward of Banda point, or Kilongo river south point bears northward of N. 73° E. (east mag.)."

Longobondo river, 11 miles SE. of Kilongo point, has very little water in it at the best time of the year.

Killu river.—From Kilongo point to Killu river the distance is 25 miles in a SE. by E. direction, the intervening coast being moderately even and wooded, terminating in a high hill, known as Salomba mountain, about 12 miles northward of Killu river. This part of the coast is not safe; the bottom is composed of sand and rocks, and the shore should not be approached within the depth of 9 fathoms. Further out in 11 or 12 fathoms the bottom is soft mud. There is a considerable outflow from the river, and the soundings NW. of its mouth are very irregular inside 10 fathoms.

The Killu river appears to be a large stream, and its entrance may be recognized by two small wooded eminences known as the Paps of Killu. The river extends across a flat country for a distance of 27 miles in a northeasterly direction from its mouth, and at this point becomes forked, the one branch trending NE. and the other SE. The river entrance is barred by a high bank of sand making entrance to it impossible even for boats. The south point of the river is wooded and of moderate height, and may be considered the northern point of Loango bay.

The muddy waters of the Killu extend far into the offing, and might lead a vessel to believe she was passing over shoals.

Mullet bank is a narrow ridge of hard sand and rock, and within a depth of 8 fathoms is about 15 miles in length 5 miles off shore, and midway between Kilongo point and Killu river. The least known water, 4½ fathoms, is near the center, and from the north point of Killu river is westward distant about 11½ miles; off its western edge the water suddenly deepens to 9 and 10 fathoms, while between the bank and the shore, there are depths of 9 and 10 fathoms.

Loango bay (Inden gulf).—About 14 miles SSE. of the mouth of Killu river is Indian point, a low projection forming the SW. point of Loango bay, which is three miles deep between its boundary points. The land at the bottom of the bay, when seen from a distance of 3 miles, shows a thick line of trees around the beach. Northward of the bay and a little distance inland is a flat-topped hill, with precipitous shoulders; and just southward of the bay is a continuous chain of hills which decrease in height toward the south.

A little northward of Loango bay, are some red clayey hills of moderate elevation, which are steep on their shore side, and marked with ravines or fissures which gradually decline to low land in the center of the bay. These fissures form green lines separating the barren parts of the hill, and being dotted with palm trees, resemble hedges between cultivated fields.

Indian point, in latitude 4° 40′ S., is low and wooded at its extremity, but a little inland it rises and shows some bare hills of a reddish tinge, between which the ravines are covered with vegetation. There is a white pyramidal beacon on the extremity of the point.

Spit.—A spit, formerly known as Indian bar, extends 2 miles northwestward of Indian point, at which distance there is a depth of 4¼ fathoms. At 1½ miles from the point the depth is but 2½ fathoms. No vessel, however small, should cross Indian spit, as the bottom is rocky and the sea frequently breaks heavily upon it.

The French station, or the storehouse, just southward of the entrance to the lagoon, bearing S. 72° E. (S. 55° E. mag.), leads clear northward of Indian spit.

Buoy.—A conical buoy with red staff is placed off the end of the spit in 6½ fathoms water, with the observation spot on Indian point bearing S. 40° E. (S. 23° E. mag.), distant $2\frac{8}{10}$ miles.

Mission.—There is a French Catholic mission southward of the factories on the east side of the lagoon. Boats can reach the mission landing by keeping close to the eastern shore when past the cliff. The mouth of the lagoon is very shallow, but the boat channel is kept free by the mission people.

There are American, French, and Portuguese factories on the south side of the bay, and a Belgian and other factories to the northward near Kissenga; these serve to identify Loango bay.

Landing place.—A fresh water stream falls into the sea through a lagoon on the eastern side of the bay, and is only separated from the sea by a narrow strip of sand; the water is, however, bad. Good landing under ordinary circumstances may be effected within the entrance of the lagoon, the depth after entering deepening to 2 and 3 fathoms for some distance inside. Should there be a swell, a better landing place is on the point, which is more immediately protected by Indian bar.

Light.—A fixed white light 111 feet above the sea, and visible in clear weather 7 miles, is exhibited from near the cliff in Loango bay, ½ mile south of the French station.

Town.—The town of Buali, or Loango, is the capital of the kingdom and the residence of the king; it is the most important of several trading towns, and lies 5 miles from the shore and 15 miles northward of Indian point. The town is large, with broad regular streets lined with trees and kept in good order, many of the huts being arranged in squares. Some of the buildings are large.

Supplies.—By giving timely notice, sheep may be obtained, and when killed cost about 14 cents per pound; other supplies are scarce. Fish in large quantities may be caught with the seine; and water, clear and cool, may be obtained in small quantities from a rocky cliff just northward of the landing place within the entrance of the lagoon on the eastern side of the bay.

These supplies may be obtained at a reasonable rate from the natives, who, though not remarkable for honesty, are otherwise friendly, and thoroughly understand the value of money, which they prefer to cloth, clothes, and bottles. The principal article of trade is ivory, which is very abundant.

Tides.—It is high water, full and change, in Loango bay at 4h. 13m.; spring rise 6½ feet. The ebb stream runs out of the bay with considerable velocity, especially during springs.

Directions.—Approaching Loango bay from the northward from abreast Kissenga or the Belgian factories, bring Indian point to bear westward of S. 20° E. (S. 3° E. mag.) to avoid Indian spit. The French station kept between the bearings S. 73° E. (S. 56° E. mag.) and S. 51° E. (S. 34° E. mag.) will also lead into the bay clear of danger. A good position for anchoring is in about 4 fathoms, mud, with the French station bearing east (S. 73° E. mag.) and Indian point S. 12° W. (S. 29° W. mag.). Approaching from the southward do not stand in less than 9 fathoms, until the French station bears S. 73° E. (S. 56° E. mag.). The Catholic mission

with white roof, bearing S. 51° E. (S. 34° E. mag.), will lead eastward of Indian spit and to the anchorage.

In the stormy season, which begins in October, it is more prudent to anchor in the position indicated than further in, as the squalls, which are sometimes very violent, generally come from the eastward, and if a vessel parted her cable or dragged from an in shore position, she would be in danger of tailing on Indian bar. But there is little chance of dragging if a vessel be well supplied in ground tackle, as the bottom is very tenacious. Even during the finest weather rollers are not infrequent, and though most authorities recommend immediate departure, the movements of the ship must necessarily be left to the discretion of the officer in command.

Soundings.—The bank of soundings appears to extend a long distance off on the parallel of Loango bay. Thus 5 miles outside the line joining the points of the bay there is a depth of 12 fathoms; at 14 miles, 18 fathoms; and thence increasing to 60 fathoms at a distance of 50 miles, but great caution is necessary, as there are only 4¼ fathoms at 2 miles northwestward of Indian point.

Conflict bank.—This bank, with 5½ fathoms water, lies S. 22° W. (S. 39° W. mag.), about 3 miles from Indian point. There are 10 and 12 fathoms on its southern and western sides, and 7 and 9 fathoms between it and the shore.

Black Point bay.—At the distance of 8 miles SSE. of Indian point is Black point, the southern boundary of a bay of the same name, which falls back 2 miles inside the line joining its extremities. Black point, is long and low, with a dense mass of trees standing out abruptly into the sea and terminating in a sandy point.

From Black point the shore of the bay trends to the eastward for about 1¼ miles and forms a low, narrow, sandy peninsula, which runs parallel with the bottom of the bay. Within the peninsula, whose eastern extremity is known as Sandy point, is a lagoon, whose size and depth are ever varying. For instance, in 1845 there were 2½ fathoms at the entrance and within the lagoon; while the following year, in the same places, there was hardly sufficient water for boats; and again in 1863 the place was all but filled up, there being only a narrow passage, barely wide enough to admit a small boat; and by 1884 there was only a boat passage to the French factory, at high water. At the bottom of the bay is a lagoon and village.

From Black point a bank which breaks occasionally extends in a northwesterly direction nearly a mile; it is steep-to on its outer edge, and beyond it for one mile the bottom is rocky and soundings irregular; an offing of 2 miles should be kept when rounding the point. The soundings in the bay are regular and diminish from 10 fathoms on the line joining the points to the shore. There are doubts respecting the existence of a bank of 6 fathoms marked on the chart about 5 miles south-

westward of Black point. H. M. S. *Conflict* passed over the assigned position on several occasions and found from 14 to 17 fathoms water.

There is a French factory in the bay, also several Portuguese factories. The mail steamer from Liverpool, monthly, to the Kongo, calls here.

Supplies.—Pigs, goats, poultry, fruit, and vegetables may be procured, but occasionally some little time is required, to allow the natives to bring stock from the interior. Fish may be caught with a seine, but water can not be procured without great difficulty.

Tides.—It is high water, full and change, in Black Point bay at 4h. 13m.; springs rise 6½ feet.

Directions.—When making for the bay from the southward care must be taken not to confound Black point with another point of similar apperance about 6 miles southward, known as False Black point; it is therefore necessary to use extreme caution. A good anchorage is in about 4½ fathoms, with Black point S. 34° W. (S. 51° W. mag.), and Indian point N. 28° W. (N. 11° W. mag.), where the holding ground is good, but ground swell unpleasant. The remarks made respecting rollers in Loango bay, apply also to Black Point bay.

Massabé, or Loemmé, river.—From Black point the coast runs SE. by S. for a distance of 18 miles to the mouth of Massabé, or Loemmé, river, the northern boundary of the kingdom of Kakongo, and is moderately high and wooded, with a sandy beach and some prominent undulations. The beach, after passing False Black point, is bordered by palms; about 3 miles southeastward from the latter point there is a rocky bank which appears to extend off for upward of ½ mile, the depths varying from 30 to 16 feet. Some breakers mark the north point of Massabé, or Loemmé, river.

The river has only a depth of 2 feet across the bar at its entrance, and is but from 10 to 15 yards in width up as far as Ndgeba villages, whence it attains a width of 50 yards in places up to Kuéte. With the exception of a bar of 6 feet near the entrance to Kaio lagoon, there is a depth of about 2 fathoms as far as Chikambo, a distance of about 70 miles, and to N'kula Mando, some 40 miles beyond; thence the depths gradually decrease to Kuéte, where there is but 2 feet of water in the dry season. The river was much obstructed in 1886 by trees which had fallen across it. It is navigable for steam launches of 3 feet draft all the year round as far as the N'kula Mando, about 110 miles from the sea.

Massabé is a French station on the northern side of entrance to the river and to Chissambo, or Bengo, lagoon. It is the southernmost of the French stations on the coast. The boundaries of the French and Portuguese territories are shown on the chart.

Portuguese and Dutch factories are situated on the south side of the entrance.

Kaio, or Grand Baffo, lagoon, about 2½ miles in diameter and with a depth of about 2 fathoms, is about 10 miles up the Loemmé river. There are several factories on its northern shore. The Foleba lagoon, a few miles above the Kaio, although larger is not so deep.

The stream is said to run out of the river at the rate of about 2 miles an hour in the rainy season, but it is probably much greater during the heavy floods.

Anchorage off Massabé may be had in 5¼ fathoms water, fairly good holding ground, with the Dutch factory flagstaff bearing N. 56° E. (N. 73° E. mag.) at about 1¼ miles from shore.

Landing.—The best landing place is opposite the boat house for the bar canoes. Ships' boats can not be used.

Kakongo, or Chiloango, river.—This river, which is of considerable size, lies SSE. about 9 miles from Massabé river; its waters discolor the sea for a distance of 7 miles off shore, in the depths of 17 and 19 fathoms. The shore between the rivers rises to hills of moderate elevation, and the position of the mouth of the Kakongo is marked by red hills which fall steep to the strand. On the northern bank of the river, not far from its mouth, is the trading station of Chiloango, and on the right bank of the river, 30 miles from the sea, is the town of Kaya, while 8 miles further is the town of Bunia. The river trends southeastward for a short distance, and then turns inland; but little is known of its entrance or navigation.

Landana.—The stream and village of Landana lie about one mile southward of Kakongo river, and is one of the largest factory stations on this part of the coast. It may be easily recognized by the remarkable white house with a flagstaff (French flag) on the bluff southward of the village. It is a great entrepôt for the produce of the interior, and is the market where all direct trade with the natives is transacted by the Portuguese and Dutch, who have factories extending a long distance up Landana river, and which is stated to communicate with the Kakongo. There is a French missionary establishment here. The bottom within 2 miles of Landana is rocky, and therefore dangerous, but at 3 miles off shore H. M. S. *Vestal* anchored in 5 fathoms, mud. Between Landana and Malemba a vessel should not stand into less than 6 fathoms.

Supplies.—A little stock and a few vegetables may be obtained at Landana by giving 24 hours' notice, but the landing is generally very bad and often impossible. The safest plan is to keep outside the surf and await the arrival of a large canoe, which the people on shore generally send off. These remarks also apply to Chiloango. The best plan is either to proceed to Kabenda, or anchor anywhere between Landana and Kabenda, when the native canoes will come off with pigs, goats, eggs, yams, and plantains.

Landana point.—This point, which is about one mile southward of the village, projects a considerable distance into the sea and presents a bold bluff appearance. It is the most conspicuous headland on this part of the coast.

Light.—From an iron pillar erected on the point is exhibited at an elevation of 112 feet a fixed white light, visible, in clear weather, a distance of 12 miles.

Shoal.—The French Packet *Ville de Maceio* is reported to have struck upon a sand and gravel bank lying opposite the village of Chinchoxo, to the north of Landana, at a distance of 2 miles from the coast. The vessel was drawing 17 feet water; soundings around her gave 13 and 16 feet. This bank lies in the way of vessels bound to the anchorage of Landana.

Malemba bay.—At the distance of 10 miles south of Kakongo river is Malemba point, the SW. point of Malemba bay. The point consists of a grass-covered tongue of land, extending in a NW. direction from the base of some high red cliffs studded with trees. The locality may easily be recognized by the abrupt red chalky cliffs, covered with vegetation, north and south of the bay.

The small bay of Malemba is in form similar to all the indentations on the African coast south of the equator, which fall back in a SE. direction, and are protected on their western side by a low tongue of land, prolonged into the sea by a shoal bank, or spit. This peculiarity of form is probably occasioned by the combined action of the southwesterly swell and the prevailing current which flows along the coast from southward. When coming from seaward, these shallow bays are very difficult of recognition, as the low points, not being distinctive in character, are absorbed in the background, and this is especially the case in the appearance of Malemba bay when viewed from the offing.

Malemba point is prolonged seaward in a NNW. direction by a bank 1¼ miles in length and ¼ mile broad. The general depth on this tongue is 3 fathoms, but there is one spot nearly 1,800 yards from the point, on which there is only a depth of 12 feet. Inside the bank, the breadth of the bay is nearly a mile, the depths being very regular from 4½ to 4 fathoms, hard sandy clay. Malemba bay, though affording a snug anchorage for small vessels, is not adapted for vessels of large draft, as they are obliged to anchor further out, and thus become exposed to the heavy rolling sea.

Rollers are frequent and strong, especially about the time of springs; and they occur most frequently during calms, so that even small vessels are unsafe within the bank off Malemba point (unless well in toward the depth of the bay), where during tornadoes, or with heavy rollers, they are placed in circumstances very similar to what has already been described in reference to Loango bay. On this account, therefore, ships which only require water frequently anchor southward of Malemba point in 6 or 7

fathoms, mud, about 2 miles from the shore, which is abrupt, with a narrow sandy beach. There is an excellent fall of water here.

Malemba.—The town of Malemba stands near the margin of a cliff of red argillaceous earth, that rises abruptly from the seashore to an elevation of about 100 feet. On gaining the summit of this cliff, an extensive and beautiful plain presents itself to the east and south. Northward, the country is broken with the windings of the Massabé river, the margins of which are finely wooded. The plain is covered with luxuriant grass, and clumps of trees are scattered upon its surface, having the appearance of being planted by the hand of man, to afford shelter from the sun and rain, as well as to adorn the landscape.

Anchorage.—Large ships generally anchor well to the northward of the bay in 5 or 6 fathoms, with Malemba point bearing S. 28° E. (S. 11° E. mag.); but small vessels by going well into the bay, may lie in smooth water; and the mark for hauling southward after rounding the spit is the southern land just shut in by Malemba point. Landing may be effected in a cove within Malemba point, and a small stream runs into the bottom of the bay, whence excellent water may generally be procured without difficulty, excepting near the end of the dry season, when sometimes it is nearly dried up.

Climate.—The climate of Malemba in comparison with other parts of West Africa is very salubrious, owing to the dryness of the atmosphere and soil and the absence of those dense forests so common in other districts. The Europeans trading here have, in consequence, almost uniformly enjoyed good health.

Natives.—The natives are a mild, tractable, inoffensive people, not at all warlike, and contrasting favorably in these respects with the people of the Gold coast, who are turbulent in disposition and adverse to improvement; but they are extremely indolent, to which their diminutive stature and absence of muscular energy may be attributable. They have also been accused of being somewhat unscrupulous respecting the appropriation of property.

Cascaes point.—From Malemba point the coast trends about SSE., 5 miles to Cascaes point, the termination of the cliffy coast, which makes like a table-land of moderate elevation. Southward of Cascaes point, which forms the northern boundary of Kabenda bay, the hills which line the coast disappear, and a low broad plain, studded with palm trees, extends as far as the mouth of the Belé river.

Belé river lies about 6 miles from Kabenda point, and is a small stream forming the southern limit of the territory of Kakongo, and the northern boundary of that of N'goyo, which extends as far as the right bank of the Kongo river.

Belé bank.—From the south point of the Belé river, a bank of sand and rocks extends in a westerly direction for a distance of 2 miles, having on its outer end only 2¾ fathoms, but the sea does not break, excepting with the ground swell. It is therefore necessary to keep about 4 miles off shore when passing this locality; and when proceeding from Malemba to Kabenda, care should be taken to preserve a good offing, and keep the lead going, in order to preserve a proper depth. In 1853, H. M. S. *Alecto*, touched on the outer edge of Belé bank in 3 fathoms, with the town of Porto Rico on the heights of the bay of Kabenda, S. 11° E. (S. 6° W. mag.), 3½ miles distant.

Kabenda bay.—This bay is formed within Kabenda point in latitude 5° 32′ 30″ S., which lies south, distant 13 miles from Malemba point, and about 3 miles from the coast whence it projects, thus forming a spacious bay, the greater part of which, however, is not available for anchorage on account of shoal water. Kabenda point is low and covered with bushes, with some huts visible near its extremity. The range of hills extending from the north bank of the Kongo terminate just south of Kabenda and assist in identifying the place.

A bank runs along the west and SW. sides of the point to the distance of ¾ mile off, and joins the point at its northern end, off which, but close to, are some rocks, and within them to the eastward is a convenient landing place. Thence the coast curves inward for a distance of 1½ miles, forming a fine sandy beach, which then trends northward. The 3-fathom line across the bottom of the bay extends 1½ miles from the depth; but extending from it northwestward is a rocky tongue one mile long and ½ mile broad, on which rollers frequently break. On this tongue, near the western edge are 2½ fathoms, with Kabenda point bearing S. 20° W. (S. 37° W. mag.), distant 1¾ miles.

The town of Porto Rico, or Kabenda, stands on the sides or summit of some elevated land, about ½ mile within Kabenda point; it can not be recognized when approaching from the northward, the trees having grown up in front of it. In 1890 the garrison consisted of 500 Mozambiques. There is an English factory (white house and flagstaff) ½ mile eastward of Kabenda point, which is a conspicuous object from the northward. At the SE. corner of the bay, just north of Locola river, is a Dutch factory, and on the east side of the bay are two other factories, English and Portuguese.

Watering.—With respect to watering, Mr. W. J. Cunningham, Master, R. N., writing in 1863, observes: "We anchored in Kabenda bay and watered from the Locola stream at the bottom of the bay; there was scarcely entrance for a boat, even at high water, but by anchoring the boat close in to the beach opposite the stream (the intervening sandy spit being about 40 yards broad), and carrying barricoes across, we got a supply of very good water. The stream was setting out at the rate of 2 or 3 knots;

but it is said there is scarcely any water during the dry season." In 1890 the water from the Locola stream was not fit for drinking.

Pier.—There is a small landing pier about ¾ mile east of Kabenda point near the English factory.

Light.—A light, fixed red, is exhibited on Kabenda point. It is elevated 50 feet above the level of the sea, and should be visible, in clear weather, from a distance of 7 miles. It is shown from an iron tripod, painted white. A fixed white light is shown from the Dutch factory; the light is visible 2 or 3 miles.

Buoy.—A buoy has been placed to mark the in shore limit of the anchorage for the Portuguese mail steamers northward of Kabenda point. This buoy is a large conical buoy, painted red, and moored in 3½ fathoms, with Kabenda Point lighthouse bearing S. 6° E. (S. 11° W. mag.) distant one mile. The buoy is not to be depended upon.

Tides.—It is high water, full and change in Kabenda bay, at 4h. 35m.; springs rise 5 feet.

Population.—The numerous huts that skirt the bay in groups and extend inland to the distant hills can scarcely be considered as forming a town, but rather an assemblage of villages, each under the control of a petty chief; but the whole subject to a king, whose capital is a large town about 6 miles inland.

In some respects the inhabitants of Kabenda resemble the Krumen of the Gold coast, as they readily engage themselves to serve on shipboard during the stay of the vessel south of the equator, and are very useful in loading and unloading ships. The skill and enterprise displayed is quite peculiar to this interesting people, while the hire of their boats and personal services are almost nominal. They are generally preferred to the natives of neighboring localities as hired people, and are very tenacious of their honorable name as good and experienced seamen, and deem any remark expressive of a doubt on this subject as a personal insult.

Communication.—Mails arrive on the 19th and 29th of each month and leave on the 19th for Loanda and direct to Lisbon.

Coal.—A small quantity of patent fuel is kept in stock which might be supplied in an emergency.

Supplies.—The country surrounding Kabenda, as viewed from the bay, appears in a high state of cultivation; and the fertile soil produces in abundance plantains, bananas, pineapples, cassava, yams, Indian corn, and sugar cane.

Goats, pigs, and poultry are abundant and may be obtained at a reasonable price; beef and mutton are scarce. Groceries may be obtained. The bay abounds with fish, and water may be had from the Locola river. Small repairs to engines can be effected at the Portuguese factory.

Directions.—When approaching Kabenda from northward, a vessel should not haul in for the bay until the English factory within the point bears eastward of S. 17° E. (south mag.), and when coming from the southward, not until the English factory bears S. 62° E. (S. 45° E. mag.). These two bearings will clear, respectively, Belé bank and the shoals off Kabenda point, and a vessel may safely approach Kabenda point and anchor.

A good line of direction on which to approach Kabenda is the English factory bearing about S. 40° E. (S. 23° E. mag.) until the scattered village of Vanaté, north of the Dutch factory, bears S. 67° E. (S. 50° E. mag.), when you may anchor in 3½ fathoms; or steering for Vanaté on that bearing anchor in about 3¼ fathoms, with Kabenda point about S. 39° W. (S. 56° W. mag.). In connection with the anchorage in Kabenda bay, there is much discrepancy respecting the best position; for, while some authorities recommend an inshore berth, others as strongly advise keeping well out.

Lieut. Sisson, H.M.S. *Firebrand*, in his Remark Book, 1880, states: "I believe that the nearer a small vessel (drawing 10 to 12 feet) anchors to Hatton and Cookson's wharf, the safer she will be. Their steamer, drawing 14 feet when laden, lies at moorings off the wharf, and she is never affected by the rollers."

Rollers.—It is not prudent to anchor in Kabenda bay in less than 3¼ fathoms, which depth extends over some distance, for there is always a swell in the bay, especially during the prevalence of smokes.

But as the desired position must necessarily depend on circumstances, it would be as well to observe that as the rollers frequently set in with great violence, it is unadvisable to take up an in shore berth if intending to make only a temporary stay, and therefore the land to the southward about Red point should be kept just open of Kabenda point, and the large house on the top of the hill should be brought to bear S. 28° E. (S. 11° E. mag.); in this position there will be from 4 to 5 fathoms water.

Staff Commander R. Dyer remarks, that with the land about Red point well open of Kabenda point, he only had 4 fathoms. The resident Europeans stated that it silted up in the dry season and scoured again with the outpour from the rivers.

The coast.—From Kabenda to the Kongo river, a distance of 33 miles, the country is particularly fertile and has a most luxuriant appearance, with apparently a large population. The land is generally low near the shore, but sometimes terminates in a cliff, while at a short distance inland may occasionally be seen a high and sloping ridge of beautiful park land, the valleys presenting a most picturesque aspect, abounding in groves of trees, among which the common palm is conspicuous.

From Kabenda point the coast trends SSW. for 12 miles, as far as Red point, and the bank which surrounds the former point extends along the

coast with a breadth of 1½ miles, as far as Red point. Some parts of this reef are generally marked with breakers. The coast between these points is low and fringed with wood, but a little in the interior, about 3 miles south of Kabenda, the land rises to hills of a reddish color, which extend with nearly uniform height to the Kongo river. The termination of this ridge to the northward, points out the locality of Kabenda. Off this part of the coast a good offing should be preserved, on account of the bank which runs along it. At the distance of 5 miles off, the depths are 5 and 5½ fathoms, and 6 miles off Kabenda point the depth is 9 fathoms.

These hills, of an argillaceous nature, burned by the sun and beaten by the rain, are very friable. Numerous streams descend from their summits during the rainy season and cut deep gullies in the sides. At the distance of 5 miles south of Kabenda, two of the hills are somewhat higher and nearer the shore than those around them, and are known as the Two hills, but they are difficult to make out. Within this first line of hills, a good distance in the interior is another range, and their distinct character becomes more apparent when seen from southward of Red point.

Red point.—This point, which is in fact the northern point of the estuary of the Kongo river, is low at its extremity and covered with trees; it is hardly discernible from westward, and difficult to identify from southward, as the shore cannot be approached sufficiently near to open it out, but it is prominent enough when seen from northward if moderately well inshore. The land rises within it for a short distance to a small eminence known, on account of its color, as Red mount, and near it is a grove of palm trees, resembling a plantation.

Rollers have been known to break in 7 fathoms off Red point; the whole shore between Kabenda and Red point is dangerous, and should not be approached nearer than 7 fathoms.

Landmark.—The Dutch factory, consisting of three white buildings, about 8 miles southward of Red point, and close northward of Vista, is a good landmark when approaching the Kongo from the northward.

Coast.—From Red point to Bulambemba point, on the north side of the Kongo river, the coast trends SE. 26 miles, and presents a narrow sandy beach of nearly the same aspect as that already described. As far as Banana creek, there is a range of hills, of almost uniform height, bare in some places and in others covered with trees. On this shore, 17 miles from Bulambemba point, is the village of Ma Camma, and at 11 miles from the point a narrow stream, known as Mosquito creek, which may be recognized by a remarkable grove of trees, known as Fetish wood, on its right bank. At the distance of 3 miles from the same point is a narrow tongue of land called French point, and into the space between, the waters of Banana river and Pirate creek join the sea. In the mouth of these two streams will be found 2½ to 2¾ fathoms.

Mona Mazea bank, the name signifying "little water," commences about 4 miles south of Red point and extends along the whole line of coast as far as the entrance of the Kongo. In some places the 3-fathom line extends 4 miles, and its 5-fathom boundary 7 miles, off shore; and from these depths the bank generally shoals gradually toward the shore, though in some places the depths are irregular and vary suddenly. It would even appear that the depths on this bank had diminished since it was surveyed, and that its breadth had augmented, or at least that new plateaux had formed outside of the original edge. The bank should be avoided, so as not to expose a vessel to unknown dangers, and also to avoid the constant swell which assumes the character of rollers, principally at full and change. It is asserted by some that these rollers are not dangerous, as their direction is at a right angle to that of the current, but it is always prudent to anchor with sufficient margin of water under the keel to allow largely for rise and fall of the swell. It will be shown hereafter that the rollers can be made available when intending to cross the mouth of the Kongo.

The current from the river always runs strongly over the bank (so that without a commanding breeze vessels become unmanageable), and cuts its way to seaward for many miles in the direction of the line of coast toward Red point, leaving a space of comparatively slack water in shore to the NE. The color of the water marking the Kongo stream soon shows if the vessel is too far out. Sometimes, though very rarely, the stream turns in upon the shore past Kabenda. When this happens it runs with great force, and dangerous eddies have been observed in the Kongo current at times of full and change, and the sea breaking with violence over some parts of the Mona Mazea bank.

Navigating Lieut. Rogers states that the bank extending from Red point, southward to Bulambemba point, has greatly increased, and the shoal water extends nearly 2 miles further out than marked on the chart.

Lee and Pandora patches.—The former of these patches, with $1\frac{3}{4}$ fathoms, lies S. 70° W. (S. 87° W. mag.) nearly $8\frac{1}{2}$ miles from Mosquito creek, and about N. 14° W. (N. 3° E. mag.) 11 miles from Padron point; its position is nearly 2 miles without the supposed 5-fathom limit of Mona Mazea bank. The Pandora patch with $2\frac{3}{4}$ fathoms lies upwards of 3 miles S. 62° W. (S. 79° W. mag.) from Mosquito creek, and $1\frac{1}{2}$ miles outside the supposed 3-fathom line of the bank. These shoal spots were discovered by H. M. ships *Lee* and *Pandora* in 1863 and 1866 respectively. There is also another patch of 4 fathoms, discovered by H. M. S. *Vestal* in 1868; it lies S. 76° W. (N. 87° W. mag.) $9\frac{3}{4}$ miles from Mosquito creek. Great caution should be exercised when in the vicinity of these shoal spots.

Kongo (Congo), or Zaire, river.—In 1482 Diego Cam set out from the Portuguese settlement of El Mina to continue the examination of the west

coast of Africa, and in doing so crossed the equator and discovered the Kongo river, which obtained for the fortunate explorer well deserved renown. On the southern point of the river he erected a marble column to commemorate the discovery, and hence the name of point Padrão (Pillar), now corrupted into Padron point.

The Portuguese discoverer conferred the name of Kongo on the river from the name of the country through which it flowed, but he afterwards found that by the natives it was called Zaire, and the two names since that time have been used indiscriminately by Europeans. It now appears that Zaire is the general appellative for any great river, like the Nile in North Africa, and the Ganges in Hindustan, and that the native name of the individual river in question is Moienzi enzaddi, or the river which absorbs all other rivers.

The Kongo river is considered to be the second in magnitude of the African rivers, and is about 2,000 miles in length.

Since then (1874–77) the Kongo has been traced from its source in lake Bemba, or Bangweolo, by the African traveler, H. M. Stanley; from this lake it flows nearly due north to the equator, crossing it in longitude 25° E., falling over in its course 7 cataracts, named the Stanley falls; it then takes a WNW. direction to latitude 2° N., then west to longitude 20° E., thence bearing SSW. and SW., descending 32 cataracts within the distance of 100 miles (named Livingstone falls), the last cataract being about 120 miles from the sea.

Between Stanley pool, 100 miles NE. of Livingstone falls, and the Stanley falls there is navigable water for a distance of 600 miles. During the last 3 years (1879–82) roads have been constructed under the direction of Mr. H. M. Stanley, from below the falls for 230 miles along the north bank, beyond the Stanley pool, and well into the upper navigable waters. Trading establishments are being organized along the route.

The mouth of this noble estuary lies between Red point on the north and Padron point, which bears from the former point S. 9° E. (S. 8° W. mag.) 25 miles; but 9 miles eastward of this line, the entrance is narrowed to 6 miles between French point on the north and Shark point on the south; and thence for a distance of 25 miles the lower course of the river trends about E. by N.

The banks of the river, formed of alluvial deposits, are covered with mangrove, one species of which grows to a considerable size, with a straight stem sometimes 100 feet high, supported by an arch of roots which rise as much as 20 feet from the ground. The spaces between these giant palms are filled with various kinds of trees of smaller growth. Other parts of the banks are covered with the common mangrove of low growth.

The country near the river is low and marshy, but at some distance inland may be seen some wooded hills. Shark point, which lies about 6 miles eastward of Padron point, is covered with the tall mangroves described above, and is considerably higher than the land on either side of it. This point lies 7½ miles S. 78° W. (N. 85° W. mag.) from Bulambemba point, and by some these points have been incorrectly described as the entrance boundaries of the Kongo. Abreast of Bulambemba point the river is narrowed to 3½ miles, and so great is the strength of the current in this locality that no bottom has been obtained with 90 fathoms; but along the south side of the river from Shark point upwards, the soundings are tolerably regular.

Current.—The river brings down an immense volume of water, which has hollowed for itself a narrow bed of variable depth; and in some places no bottom has been found with 200 fathoms of line. It does not follow that the bed of the Kongo is 200 fathoms deep because no bottom was obtained with that quantity of line, for the velocity of the superficial current must necessarily increase the amount of stray line and thus render the operation of sounding beyond a certain depth very difficult. At the distance of 9 miles to seaward its waters are quite fresh; at the distance of 40 miles they are only partially mingled with those of the sea; while the discoloration caused by the fresh water has been known to extend 300 miles off, where the current also has been reported to be perceptible; so that ships going north or south across its line of route should be prepared to make allowance for it.

In May, 1867, H.M.S. *Oberon* experienced a set of no less than 220 miles, in a general NW. direction, in 4 days, between the position of latitude 0° 15′ S., longitude 5° 45′ E., and latitude 4° 20′ S., longitude 10° 34′ E.

From the great inclination of the sides of the river bed the volume of water flows out in an unbroken stream, with a velocity varying from 4 to 8 miles an hour, and forms no delta; but the course of the main body is indicated by floating islands, consisting of bamboo and débris of all kinds, which are met with far out at sea. These floating masses are sometimes so compact that it is impossible for a vessel to make headway through them without the assistance of a fresh breeze. The floating islands of the Kongo are frequently carried as far north as cape Lopez, and the coast from Kabenda is strewn with marshy débris from the river. Commander Richards observes, 1864: "I have seen grass islands, perfectly green and fresh off Annobon island."

The rainy season in the Kongo generally begins early in November and continues until the middle of April, and the rising of the river generally occurs about six weeks after its commencement, when it rises 9 feet above its ordinary level. The stream at this time is very rapid, and bears along

the floating islands, some of which are more than 100 yards in length and are frequently dangerous to ships under way, but especially so to those at anchor.

French point is the southern termination of Banana peninsula, which is a narrow sandy spit 2 miles long, forming the western point of the opening leading to Banana and Pirate creeks. The point is surrounded by a bank of sand and rocks, which extends in a southerly direction ¾ mile, with deep water close to its edge, while on its western side the 3-fathom line runs out to a distance of 1¾ miles from the point. The outer edge of the bank will be cleared by bringing Bulambemba point to bear S. 71° E. (S. 54° E. mag.). Near this latter position the flood stream is occasionally felt, and vessels obtain temporary anchorage in from 4 to 8 fathoms. The flagstaff is on the southern edge of the point.

Banana and Pirate creeks.—These two streams flow into the sea between French and Bulambemba points, and are the outlets of a branch of the Kongo communicating with Monpanga islands. Good anchorage can be obtained in either for vessels of small draft, but the entrances are narrowed to less than 400 yards by the delta of the streams, and as these banks are constantly shifting, strangers should not attempt to enter without the assistance of local knowledge. A pilot invariably comes out when a vessel is observed to be approaching the entrance.

There are two Dutch factories on Banana peninsula, each being distinguished by a flagstaff, and two coaling wharves with 10 and 15 feet alongside at low water.

Greatest draft.—Vessels of 18 feet draft and 260 feet in length have entered Banana creek in charge of a pilot.

Light.—A harbor light, fixed white, is exhibited on French point. It should be visible 11 miles.

Communication.—There is mail communication every three weeks from Liverpool to Fernando Po, Gaboon, Kongo, and Loanda. On the return voyage the steamers call at Ambriz, Kinsembo, Ambrizette, Kongo, Landana, Black point, Loango, San Thomé, Gaboon, Elobey, Kamerun, Fernando Po, and Liverpool, via ports in the bights. A Portuguese line of steamers leave Lisbon on the 6th of each month (call at Madeira and cape de Verde islands) for Princes island, San Thomé, Kabenda, Kongo, Ambriz, Loanda, Novo Redondo, Benguela, and Mossamedes.

A monthly steamer from Antwerp conveys parcels, etc., to the Kongo.

Buoys.—Red and black buoys mark the channel into the creek. Entering Banana creek the red buoy should be left on the starboard hand (to the eastward) and the black buoys on the port hand (to the westward). Vessels should keep close to the black buoys to obtain the deepest water. Too much dependence must not be placed on these buoys or the positions given on the charts.

Directions.—To enter Banana creek, Bulambemba point must be kept to the eastward of S. 71° E. (S. 54° E. mag.) in order to clear the spit off French point, until the two flagstaffs of the Dutch factory are in line, when keep in for them. Stand in for the buoys, leaving the red buoy to the eastward and the black buoys to the westward, keeping close to the black buoys, and bearing in mind that the Kongo stream, which is strong in this locality, sets toward the west bank of the creek. If the buoys are not in position, the outer flagstaff in line with the center of the house (with two windows in its western gable) behind it, leads over the bar in the deepest water in about 2¾ fathoms; but before the bar is reached it is probable no bottom will be obtained in 15 fathoms, as there is only one spot of 6 fathoms before getting 3 fathoms. When the plantation on the side of the hill is its own breadth open of Huard point, steer for it, passing between Stella bank and Dialmath Bank islets, in mid-channel. There is good anchorage off the lower Dutch factory in 3½ or 4 fathoms.

On the north side of Banana creek is the termination of the range of hills alluded to as extending from Red point; and from seaward these hills, which are moderately high, appear to form the shore, which at their foot is covered with wood.

Pilots.—There are two government pilots at Banana creek, and seven others in Raphael creek, Diegos bay. A piot will come onboard promptly if signaled for on the vessel approaching the buoys.

Tugs.—There are a number of small steamers connected with the several factories at Banana. They ply up and down the Kongo and along the coast; so towage can generally be had.

Supplies.—Bullocks of a superior quality, though small, may be obtained from Moanda, about 6 miles from Banana. Fowls, eggs, vegetables, etc., are scarce and dear, as the inhabitants of the creek use all that can be obtained on this side of the river; a plentiful supply can be had at Turtle cove from King Antonio.

Coal can always be obtained at Banana creek from the Dutch Trading Company, and as a coaling station this place has been found most convenient. Vessels requiring coal should give notice to the contractor the night before, in order to facilitate the operation, and if possible leave the creek the same day, as it is at times unhealthy, more especially at the end of the rainy season. About 200 tons of coal can be put into a vessel alongside the wharves in one day and 150 if lying in the creek. About 3,000 tons of Welsh and other coal are usually kept in stock.

The following remarks in connection with coaling may be found useful: If intending to go alongside one of the wharves, let go the starboard anchor well out and ahead of the pier, drop the port anchor as close in and as far ahead as possible and then drop down and lash the ship well to posts, etc., on the shore, having strong bow and stern fasts, and a kedge laid out well

on the starboard quarter. These precautions are necessary, especially during the rainy season, on account of the floating islands which sometimes come down, and fouling the ship carry all before them.

Northern shore.—Bulambemba point is also known as Fathomless point, from the fact that at the distance of ⅓ mile off, no bottom was obtained at 93 fathoms. The point is low, but distinguished by a clump of trees on its southern extremity much larger than others near the same locality; while beyond is seen the low wooded plain of the river intersected by numberless creeks.

From a distance of 18 miles west of Bulambemba point, the low coast is just discernible by the line of trees which are marked here and there by gaps, while southward the shore in the vicinity of Shark point is easily recognized by its tall mangroves.

From Bulambemba point, the low broken shore of the northern bank of the river extends 11 miles to Bull island, which appears to be a detached clump of trees close to the main shore.

From the reports of various officers who have ascended the river, the bank extending along this shore appears to be subject to great changes, at times vessels being able to keep close in to the bushes, and at other times having to keep several hundred yards off.

Capt. Zeye, commanding the German gunboat *Hyäne*, reports that in September, 1890, the depths have recently altered in such a manner that the charts are no longer of any use. From the north shore of the river sand banks extend southward as far as the deep channel, which in places only allow the passage of vessels of 3 feet draft. The bank off Scotchman head had disappeared. Instead of 22 fathoms water at the anchorage off Henderson point, there is now only one fathom.

The land between Shark point and Puerta da Lenha appears to be formed of innumerable islands composed solely of mangrove roots, while a dense mass of thicket, with mangrove, palms, and pandanas, extend to the water's edge, and the whole country in this locality may be described as a network of creeks; but beyond Puerta da Lenha the aspect of the country is changed, and the absence of mangroves is a sure proof that saline influence has ceased. On the dry spots on the banks of the creeks are many small native villages, inhabited by a people named Mushikonghis, who are or were the pirates of the Kongo.

Parker patch.—This shoal lying a little more than a mile to the eastward of Henderson point is the great obstacle to the safe navigation of the river up to Puerta da Lenha, as it appears to be of an ever varying nature, both as regards its size and the depths over it. In August, 1868, only one foot water was found in several places, whereas in 1865 when surveyed its general depth was 2¼ to 3 fathoms. In 1875, Parker patch had extended 600 yards further down the river, and the channel north of the patch

was only navigable for vessels drawing less than 6 feet. The greatest caution is therefore necessary when approaching this danger, as the chart can not be depended upon.

Puerta da Lenha.—About 12 or 13 miles above Bull island is Puerta da Lenha, formerly known as a famous slave shipping port; it stands on the northern shore of the river, at the head of what may be termed the estuary of the Kongo; for though the river is navigable beyond for boats and vessels of small draft, this place must be considered the termination of sea navigation. This town is the usual resort of those who trade to Embomma, and is the best place for procuring supplies.

Puerta da Lenha is a station for European factories; the ground on which the factories are built has been reclaimed from the swamps and river. There is no communication between these factories except by water. The station is infested with large pythons, that commit great ravages amongst the sheep and fowls of the factories; upwards of three hundred of these reptiles have been killed in one month.

Piers.—The settlement is fronted by a quay formed of piles and backed by masonry; small landing piers front the English and Portuguese factories.

Anchorage.—It is advisable to anchor as close as possible to the factories at Puerta da Lenha in from 5 to 7 fathoms, the bank of the river being steep-to, in order to avoid the floating islands which come down in great numbers. It is considered the healthiest position in the river.

Current.—The current in mid-channel off Puerta da Lenha runs generally at the rate of 5 knots an hour, and after the rain increases to 6 or 7 knots.

Directions.—The channel of the river from Banana creek to Puerta da Lenha and Embomma is constantly changing, so that no dependence can be placed on the chart; but the depth in the fairway may be considered to be about 13 feet. (In 1888 the least water between the sea and Embomma was 17 feet.)

Between Puerta da Lenha and Embomma the navigation is more intricate than below. At about one mile above Embomma the river deepens, and from thence to Noki, a distance of about 24 miles, there is a considerable depth of water, 20 fathoms or more. In this portion are several rocks, well known to the pilots, but there is not much difficulty in navigating, provided the vessel has good speed. Anchorage spaces are rare, narrow, and foul.

The services of a pilot are absolutely necessary.

Channels.—Above Puerta da Lenha, the river divides into several branches, the separation being caused by a number of islands, some of which are mere sand banks, which are often washed away in the rainy season, while others are well wooded and cultivated. The northernmost

of these channels is called Maxwell river; the middle is known as Mamballa channel, and is the most direct for Embomma, and by keeping along the edge of the islands the strength of the current will be avoided.

The South, or Souho, channel affords the deepest water, but it is winding and intricate; in the dry season a vessel of 10 feet draft may be led up by her boat, but when the river is flooded the passage is open to those of greater burden. The bottom is of a loose sandy kind, so that a vessel grounding would cause no greater inconvenience than the trouble of getting her off again at high water.

Above Puerta da Lenha the scenery rapidly changes in appearance; the dense woods disappear and are replaced for a distance of 25 miles by low flat ground covered with fennel and coarse hippopotamus grass. Fetish rock is the termination of a ridge of iron stone, and is considered sacred by the natives in consequence of the immense quantities of gum copal lying under the surface; this valuable article of commerce can not be removed owing to the supersitition of the natives.

Embomma.—The name of this place, according to Capt. Burton, should be written Boma, meaning the snake; it is the principal town of the Kongo river, and stands on the right bank, at the distance of 31 miles from Puerta da Lenha. It is delightfully situated in a dry and healthy atmosphere, and is the principal depot between the interior and the coast. This place used to be known as one of the greatest slave marts in the world.

Embomma is a large straggling town several miles in extent near the bank of the river; it stands in the midst of a picturesque and mountainous country, and perfectly clear from swamps; to this latter fact may be attributed its healthy character.

Magnificent drinking water may be obtained everywhere above Boma, from the unnumbered rills and rivulets which are everywhere trickling, wet and dry season alike, all the year round. Dysentery is almost unknown above Vivi, which is situated about 9 miles (as the crow flies) below Yellala cataracts.

According to the observations of Capt. von Schleinitz, H. I. G. M. S. *Gazelle*, in 1874, the height of the river at Embomma, above the sea, is about 273 feet, and, as the distance to Shark point is only about 61 miles, the fall of the river is very great, and partly accounts for the violent current.

Piers.—There is an iron pier at Embomma, with a depth of 16 feet at its extreme; small craft can lie alongside. There is also an iron landing pier, 150 feet in length, abreast the government buildings.

Anchorage.—The anchorage at Embomma is off the French factory in 12 fathoms, about 100 yards from the shore.

Light.—A fixed red light is shown at Embomma.

Noki.—Vessels of 11 feet draft, in charge of a pilot, may reach Noki at all seasons. Close off the factories here there is anchorage in 11 fathoms out of the current. Care must be taken in anchoring as the bank is small and steep-to, deepening suddenly to 20 fathoms. Between Noki and the falls above, although the river is deep, the current is rapid with occasional whirlpools, and it can only be navigated by steam launches.

Supplies.—Beef can be obtained from the factories at Embomma and mutton and fowls at Noki, at reasonable prices.

Southern shore.—Padron (Mouta Secca) point is sandy, rather low, quite rounding, and when seen from the north at a distance of 7 miles has the appearance of a cliff descending perpendicularly to the beach. Above the cliff the land rises and assumes a rounded form, and is covered with thick clumps of stunted vegetation, apparently of small brushwood. On this account the point is known to the Portuguese as Mouta Secca, or Dry Thicket point. These clumps can only be seen when quite near. It is not unusual to give the name Padron point to the red cliffs which bear SE. from it, so it is important not to confound them; in anchoring off the red cliffs a vessel would be too far to the south.

Light.—A light is exhibited on the point. It is a fixed white light, shown at an elevation of 39 feet above the sea, and is visible from a distance of 12 miles in clear weather.

The lighthouse is situated 120 yards from the beach and consists of an iron tripod supporting the lantern and resting on a base of rough masonry. A keeper's dwelling, painted white, with two black horizontal stripes on the roof, stands about 11 yards south of the lighthouse.

Turtle cove.—At the distance of 3½ miles NE. of Padron point is Turtle point, a slightly rounded eminence covered with tall trees; and between it and Shark point, a distance of 2½ miles, the land falls back into a slight indentation known as Turtle cove. Abreast the middle of the cove there is a bank of soundings whose 10-fathom line extends nearly a mile off shore, and this bank is admirably adapted for anchoring ground, of which more will be said hereafter.

This anchorage can always be attained from southward without the use of steam (provided the sea breeze is of moderate strength), as the current from the Kongo being turned off by Shark point is rarely felt in this locality.

Supplies.—Canoes from the village at Shark point bring off goats, fowls, eggs, and fruit. Clothes may be washed by the natives.

Tides.—H. M. S. *Trident*, in September, 1857, while at anchor for 8 days in Turtle cove, experienced a regular ebb and flow of the tide; the ebb generally running for about 8 hours at the rate of nearly 2 knots an hour, while the flood never attained a greater velocity than half a knot.

Shark point, as previously remarked, is more elevated than the shore in its immediate vicinity, and is also rendered conspicuous by a clump of

lofty mangroves near its extremity; it is the eastern termination of a low narrow point, distant from Padron point 6 miles in an NE. direction, the shore between being somewhat rounded, with its convex side toward the north.

The extremity of Shark point is bordered by a sand bank 200 yards in width, covered by 2 fathoms; outside of that the water deepens rapidly, with 30 fathoms ½ mile north. The point can be rounded at ⅓ mile without danger.

The anchorage within Shark point is so smooth and comfortable that vessels are sometimes induced to lie there in preference to Turtle cove; but they can not remain long without danger, as the anchorage is reported as most unhealthy and the tides set out so strong as to make it dangerous for boats.

Diegos bay.—Inside of Shark point the coast falls back to the southward 3½ miles, and then trends E. by N. for a distance of 23 miles to Scotchman head. The bay thus formed within the point is known as Diegos, but it is almost entirely filled with shoal banks, having only 9 feet of water, which render it useless as an anchorage. There is a narrow channel through these banks, caused by the flowing of several streams into the bottom of the bay.

Buoy.—A buoy, painted red, is moored in 5 fathoms, and marks the best anchorage in the bay. It lies S. 75° E. (S. 58° E. mag.) of Shark point, distant 2 miles.

Light.—A light is shown on the point. It is a fixed white light, shown from a lantern at an elevation of 38 feet above the sea, and should be visible, in clear weather, from a distance of 10 miles.

The lantern is hoisted on a pole 28 feet high, situated 230 feet from the extremity of Shark point, and about 72 feet NE. from a house with a white roof, which serves as quarters for the Kongo pilots.

A keeper's dwelling, painted brown with white roof, stands about 50 feet north of the light.

Trade creek.—At a distance of 4 miles SE. of Shark point is Raphael creek, and 2 miles eastward of this is Viva creek, which is apparently seldom visited; but 4½ miles further eastward is Trade creek, which lies ESE. of Shark point. This creek is generally resorted to by cruisers in want of wood and water; the former is generally found to be ready cut and stacked by the natives; but to obtain the latter it is necessary to anchor well out in the stream in about 6 fathoms, and be careful that only the surface water be pumped from alongside. The water so obtained should not be used for a week or ten days, by which time the vegetable matter will be deposited and the water pure for drinking.

Sherwood creek.—Nearly 3 miles eastward of Trade creek is Sherwood creek, or rather river, for it is ⅔ mile broad at the entrance, has

numerous reaches in every direction, with depths of from 4 to 2 fathoms for a considerable distance from its mouth. It is lined with large and lofty mangroves; and if this species of timber should ever be in request no more convenient place for procuring it will probably be found.

Higher up the Kongo, in the bight westward of Zunga Campendi island, a vessel may anchor clear of the current, although the place possesses no other advantage.

Tides.—The tide ebbs and flows regularly in this creek, and the rise and fall appear greater than at Banana creek or Shark point.

Caution.—Above Zunga Campendi no dependence can be placed on the chart, as every spring tide alters the position of the shoals. On passing the mouths of creeks keep more into the stream, as a bank extends across the mouths of all below Scotchman head.

The Missolonghis, or Mushikonghis, a tribe inhabiting the creeks about Bulambemba and Bull island, are savage, and formerly used to attack merchant vessels and boats proceeding up the river without an escort.

Products.—The soil of the Kongo territory is excessively fertile, and vegetation luxuriant; tobacco and sugar cane are cultivated; fruits and vegetables, such as are to be found in intertropical climates, are procurable; and it is believed that the cereals of Europe might be introduced with advantage. The principal articles of legal commerce are ivory and palm oil; but the forests contain many species of valuable woods.

Tides.—It is high water, full and change, at the entrance of the Kongo river at 4h. 30m.; the tide rises 6 feet. The influence of the tide upon the stream would appear to be of a variable character, but the information is very imperfect; and it is to be regretted that so little attention has been paid to this important subject. By some authorities it is conjectured that the rise is overpowered by the descending current; and to the effect of the tide may be attributed the unequal degrees of velocity of the stream, which seems to be retarded by the flood and greatly accelerated by the ebb.

It seems, however, to be an established fact that an undercurrent is sometimes found to run in an opposite direction to the surface current. Capt. W. Owen, R. N., mentions an instance in which it was observed where the ship, being becalmed and drifting with the stream, was only carried at the rate of one or 1½ miles an hour, although the surface current appeared to be moving at the rate of 4 or 5 miles. In this, as well as in other parts of the world, the depth of water has been found to vary regularly, according to the ebb and flow of the tide, although the surface stream was continuous in its progress toward the sea; and therefore the rising of the level of the water can only be explained by the flood tide acting as an under and contrary current.

The depth of this overriding stream, which necessarily preserves a superficial character, in consequence of its specific gravity being less than

that of sea water, has been estimated to be only 5 or 6 feet during the flood; and if so, it would fully account for the incident alluded to, as well as the frequent remarks of vessels being unmanageable when in the vicinity of the mouth of the Kongo. At the time of full and change there are dangerous tide races which cause the sea to break violently on a portion of the Mona Mazea bank.

Precautions regarding health.—Commander W. Grubb, R. N., observes: "February, March, and April may be considered as decidedly the most unhealthy months on this part of the coast. The termination of the tornado season is about the middle of February when cold weather begins, and heavy dews fall at night. As these changes occur sometimes within 24 hours, great care should be taken to have the crew more warmly clothed, and if quinine is available, I recommend its issue every evening for ten days or a fortnight while the change is taking place. When in Banana creek it is also necessary to issue quinine."

Directions.—When desirous of entering the Kongo river under sail only, the approach must always be made from southward, so that vessels coming from northward must cross the strength of the stream, and the necessity for doing so will be apparent from the following observations:

The stream of the Kongo sets out in a northwesterly direction until it attains the distance of 4 or 5 miles from Shark point, whence it diverges into two branches; the principal running to the NNW. over the shoal ground until it reaches Red point, abreast of which it again takes a northwesterly direction. The other branch trends to the SW., and gradually assuming a rotary motion, falls back in a southeasterly direction on the shore, about 12 miles southward of Padron point. From a position 12 miles south of this point, the current was observed to set SE. by E. 2½ knots, and the water was black and brackish; this part of the coast, therefore, should not be approached within the depth of 10 fathoms.

The waters of the Kongo are very much discolored with a yellowish red, or brown tinge, and are covered with rubbish and foam of every description. Very frequently along the shore southward of Padron point, the sea is much agitated, and shows in overfalls. At the distance of 40 miles off the mouth of the river the waters assume a dark tint, and become brackish.

To cross the stream from northward, it is requisite either to keep 200 miles off the coast, or to keep in anchoring ground; and the latter if possible, should always be selected. If not certain of crossing the stream before the sea breeze dies away, anchor on the Mona Mazea bank in 6 or 7 fathoms, until the following day, when a two hours' sea breeze will enable the vessel to cross to the southward of Shark point, where she will be out of the influence of the stream.

The soundings on the Mona Mazea bank are, with some few exceptions, regular, shoaling gradually from 5 to 2½ fathoms; and although there is

generally a considerable swell, almost amounting to rollers, they do not endanger the safety of the vessel, as they are at right angles to the current; and thus a vessel at anchor does not scend, or require much more water than her own draft to clear the ground.

The usual course for crossing the stream when coming from the northward is to beat alongshore between Kabenda and Red point, keeping on the bank of soundings, in order to anchor if the wind falls light. Having arrived off Red point, it will be necessary to calculate whether there is sufficient time to cross before the sea breeze fails; if not, anchor for the night, and weigh the following day as soon as the sea breeze is well set in.

If a vessel intending to run up the river approaches Shark point late in the afternoon, and the sea breeze begins to fail, there is no alternative but to anchor, and wait for the breeze of the following day; for if an attempt to pass Shark point be made with less than a 5 or 6 knot breeze, the vessel will inevitably become unmanageable, and be swept away to the NW., where she must anchor on getting soundings, and wait for wind to extricate herself.

The anchorage in Turtle cove, westward of Shark point, has several deep holes in it, into which care must be taken not to let go the anchor. There is good anchorage in 9 fathoms, with Shark point on with Bulambemba point N. 78° E. (S. 85° E. mag.) and Padron point just shut in with Turtle point S. 50° W. (S. 67° W. mag.) about $\frac{3}{8}$ mile from the shore. When intending to remain any length of time, this anchorage is healthier and therefore preferable to any position inside Shark point, round which boats can be sent to procure wood and haul the seine, as well as to obtain supplies of goats, pigs, poultry, etc., from the natives, who are friendly.

On approaching the river from the westward, Padron point when first seen appears like a well-wooded island, with a saddle in the middle; and if to the southward of Padron point the Red cliffs will be seen, with a double table-land behind them, extending many miles southward of the point. As Padron point is neared to within 8 or 10 miles, the low land between Padron point and Red cliffs will be seen. There are depths of 7 and 8 fathoms at the distance of 3 miles off shore so long as Shark point is shut in by Turtle point, the projection between Shark point and Padron point; but when Shark point opens, the water deepens, and when Red cliffs shut in behind Padron point, with the point bearing S. 17° E. (south mag.), and Shark point N. 83° E. (S. 80° E. mag.) there is very good outer anchorage in 12 fathoms, mud.

When approaching Shark point keep as close to it as possible, and be on the starboard tack, even if by doing so the vessel be allowed to drift a little distance; for if on the port tack and with only a moderate breeze, it would be difficult to pay her head off, in which case she will drift away to the NNW. on to Mona Mazea bank, where it is best to anchor as soon as

soundings are obtained, and weigh again when the breeze is strong enough to cross. In running for the Kongo from southward, and night coming on, it would be advisable to anchor in Turtle cove, or elsewhere off Padron point, as the attempt to make the passage after dark would be hazardous.

It is absolutely necessary to have a good breeze to pass Shark point, which should be steered for with Bulambemba point in line, and rounded at a convenient distance. When clear of the point, haul up SE. and cross Diegos bay in about 7 fathoms, taking care to keep the lead going, in order to guard against the edge of the extensive bank already alluded to, with 1½ and 2 fathoms water on it; and when within a moderate distance of the shore of Viva creek, keep alongshore and anchor abreast of Trade creek, well out in the stream in 6 fathoms.

As before observed, the attempt to enter the Kongo river should not be made without a commanding sea breeze, which usually rises about 9h. or 10h. a. m., and blows from SSW. to WSW. until late in the evening when it gives way to the land winds, which, however, are very light and not to be depended on. In the middle of the river, between Bulambemba point and the southern bank, the stream sets to the westward; but nearer the south bank it follows the trend of the coast, and rounds the western shore of Diegos bay in a northerly direction as far as Shark point, after rounding which the current takes a WSW. direction. Within the river above Bulambemba point the stream follows the direction of the banks.

The following remarks are by Commander T. Miller in 1855:

"On entering the Kongo under sail, anchor a small boat in 5 or 4¾ fathoms right off Shark point, and setting every stitch of sail pass as close outside the boat as possible. The sea breeze is always fair for entering the river, and, if fresh, there can be no difficulty; but if not so, no sailing vessel has any business to attempt going up. On clearing Shark point keep well over on the southern shore, as the current sets strongly towards the Bulambemba side. The current will be found strongest when just off the point, and even with a fresh breeze a vessel may steer rather wild; but so long as the current is kept from taking her on the port bow, which under commanding sail is easy to prevent, there is no difficulty. Should the current do so by any chance, such as the wind suddenly changing or falling calm, the anchor, which ought always to be ready, should be let go."

Wind and weather.—Between cape Lopez and the Kongo river, from October to April, the sea breezes are from SSW. and SW., and heavy squalls from SW. and west occur in December and January. From May to September the land and sea breezes are more regular; the latter at this time often set in from WNW. and blow during the night SSW. and SW., and then the land breeze is only felt close to the shore.

Off the coast of Loango the alternations of the land and sea breezes are not very regular, excepting from May to September, inclusive; in other

months the prevalent breeze from west to south varies very little from this direction. The land breezes along this portion of the coast are seldom strong, and do not extend beyond 20 or 25 miles from the coast.

At the distance of 80 or 100 miles off shore the SW. winds become more regular, and in advancing to the westward they gradually veer round to the southward and eastward, and imperceptibly unite with the SE. trade. A line drawn from about latitude 5° S. and the meridian of Greenwich, to latitude 20° S., and longitude 10° E., and curved towards the coast, may be considered as the general eastern limit of the SE. trade.

The tornadoes on the Loango coast are not so violent as those in the gulf of Guinea. They are usually strong gales of short duration from east or SE., and then gradually losing force, veer round to south and SW., from which quarter they sometimes recommence blowing. Occasionally, however, the tornadoes are very violent, and render it necessary to shorten all sail; but they are invariably a long time gathering in the east or SE., and thus give timely warning to prepare for them. In or about the parallel of the Kongo river these tornadoes cease.

The following observations on the winds and weather of this part of the coast are from the remarks of various officers who have served on the west coast of Africa, and should be regarded as their individual experiences rather than infallible rules. In January tornadoes are frequent near cape Lopez, and the current often sets to windward, the heat gradually increases and this is the worst season of the year. The prevailing winds in this locality are from SW.; but during the months of June, July, and August they are more from the southward.

In February, the land wind brings off rain, and the sea breeze often brings the foul weather back again. The sea breeze is so well to the westward as to enable vessels to lie along the land on either tack. The weather in March and beginning of April is much the same at first, but gradually improves, becoming cooler and drier; but to the northward, about cape Lopez, fair weather can not be expected before the middle of May.

Towards the end of April and throughout the whole of May the breeze blows steadily night and day down the coast from about S. by E. During June and July the "smokes" prevail all along the coast, with light land and sea breezes varying from SSE. to SSW. In August the atmosphere is cool, and even raw in the mornings, with frequent damp fogs. The breezes are generally light, and the water smooth, especially to the northward of cape St. Catherine. Land breezes in the morning do not extend more than 20 miles from the coast, and 50 or 60 miles off shore the sea breeze is pretty constant. The sky is generally clouded, and observations difficult.

In September, the weather becomes hotter, but the winds hang more to the westward and are fresher and steadier; drizzling showers are often

experienced, especially near the shore. In October the wind is still more westerly, and vessels sometimes lie alongshore on the starboard tack. Off capes Lopez and St. Catherine the breeze is fresh, and sometimes even strong. In the latter half of the month the rains begin alongshore, and light showers occur almost daily at sea, while the breezes and lee current both become stronger.

In November and December, strong breezes off the land are sometimes experienced, though not often; they bring rain, thunder, and lightning, and are generally followed by a day's calm or very light winds. The ordinary winds become very variable, with unsettled weather, and strong uncertain currents. In December the weather becomes very sultry all along this coast.

The following observations on the weather experienced on the coast southward of cape Lopez, from the remark book of Mr. Braund, Master, H. M.S. *Crane*, 1855, will be found useful:

"We were lying in Loango bay a part of February and the beginning of March, and experienced several squalls from the NW. accompanied with heavy rain and thick misty weather, as well as some gusts off the land, assuming a very threatening tornado-like appearance, but never found much wind in them. The squalls from the NW. were more frequent near the full and change of the moon, when a heavy swell rolled into the bay, but much broken by the reef.

"The weather on the coast southward of cape Lopez, throughout the months of February, March, and April, is very unsettled, with occasional rain, and threatening tornado-like appearances; but we never experienced a heavy tornado, although those appearances would warrant the shortening of all sail during the time they last. About the beginning of May the weather becomes more settled; but the currents are unaccountably irregular, at one time running northward at the rate of a mile an hour, and in a few hours after, none are perceptible. Occasionally, and without any apparent cause, they run as strong southward, but the general set may be said to be NNW.

"The weather during the end of June and the whole of July was very misty and gloomy (with heavy dews at night), making it difficult to distinguish the land even when close to it. The thermometer ranged between 66° and 72°. The winds during the months of June, July, and August were light from SW., WSW., and even sometimes northward of west. For many days there was little or no land breeze, and as the sea breeze was also light, it was exceedingly difficult to get to the different parts of the station.

"As before observed, the weather had been for some time past very misty and overcast; and it was remarked that the more dense the atmosphere, the less the force of the wind, and that if at all clear the breezes (both

land and sea) are much fresher. During the above-mentioned three months, as a general rule, the winds from seaward fell about sunset, and the land breeze (if any) did not come off till 7h. or 8h. a. m., and then was so light as scarcely to be worthy of the name.

"Toward the end of August the very heavy mists cleared away, rendering it less difficult to see the land, although occasionally we had heavy drizzling rain, accompanied with thick, misty, foggy weather. Toward the end of September the sea breezes become much stronger than for some months past, and frequently continued to blow during the whole night.

"During the month of October we had occasional showers of rain, with dull weather, the sky being generally overcast till noon, after which it usually cleared up and the sun came out very strong. During November we experienced some heavy rain, with squalls from SE., having a very threatening appearance; but generally the wind never exceeded a fresh breeze. We also had a considerable quantity of thunder and lightning."

The previous remarks will readily suggest to the practical seaman what course should be followed when sailing from north to south. Thus, excepting when the current is setting to the southward, the ship should maintain a good offing, and only approach the shore to take advantage of the land breezes which begin to blow at or a few hours before sunrise.

Currents.—The current along this coast is formed by the cold waters flowing from the higher latitudes of the South Atlantic, and that portion of the Agulhas current which rounds the cape of Good Hope, and then, as an amalgamated stream, sets along shore to the northward as far as the Kongo at the average rate of one mile an hour. Northward of Padron point its velocity is increased by the impetuous stream of the Kongo river. This stream has a tendency to set a vessel toward the coast during and after on shore winds, especially in the neighborhood of Dassen island.

Staff Commander R. Dyer, in September, 1879, remarks: "On leaving Fernando Po for Kabenda, we had the usual southerly winds, with a southerly current, similar to our previous passages in the same months. I believe it to be more the rule than the exception in the dry season, particularly in August and September."

Another authority writing of the same locality observes that in August and September there is not much current, and what there it sets off shore. From October to the end of the year the current gradually becomes stronger, and latterly uncertain; in January, it sometimes runs strong to windward. In the mouth of September, between Kabenda and the Kongo river, a current has been experienced setting north, at the rate of 1¼ knots, and, after passing to the westward of the Kongo stream, the current was found to set NE. by N. at the rate of 10 miles in 24 hours.

The following remarks on the currents along this portion of the coast are by Capt. Thomas Miller, R. N., 1855: "The current, as a general rule,

runs to the northward, though there are times when for three or four consecutive days an equally strong set to the southward is experienced, and this change is attended by a total cessation for some 24 or 36 hours of any current whatever; doubtless the atmosphere and force of wind, the latter being much affected by the former, both influence the currents."

The great Kongo current sets rapidly to the NW. for more than 500 miles; yet, rapid and powerful though it be, the Kongo stream is of no great width or extent coastwise; in approaching from the southward, it is entered in a moment, and if able to stem it and not forced to seaward, the instantaneous check on going out of it is as quickly felt.

The Kongo stream may be defined as extending coastwise to Red point, a distance of 18 miles, and it always sets very strong on the Mona Mazea bank. Vessels are frequently several days passing the Kongo when going south, but at times it is easily done in a day.

During the month of September, we experienced a very strong northerly set, when suddenly it changed to the southward, and continued equally strong in that direction for a period of five days. The winds previously had been very light, but this change was accompanied by strong land and sea breezes.

The surf on the shore is lessened, and consequently the landing is always good during these changes, however strong the breezes.

On September 26, while at anchor some 5 or 6 miles to the southward of Padron point, the current was found to have set ENE. 27 miles in 41 hours, an extraordinary circumstance, well worthy of being noted, as it is believed to be the only instance on record.

In 1874, the *Gazelle* found south of the current of the Kongo a current running NW., which the captain avoided, and he observed a current bearing east, that is to say, toward the mouth of the Kongo.

This proves that the waters of the least density rise to the surface, and on the border of a strong current a countercurrent is generally formed, on which floating objects are seen. This current is so strong that the prevailing winds from the south have not force enough to turn back the floating trees, roots, etc., on the surface. These floating objects are seen more on the north than on the south side of the current. The change of color from blue to green and the variation in density are noticed in the Kongo more than 900 miles from its mouth. There is also the presence of living creatures in the sea; the number of fish increases, and the phosphorescence increases notwithstanding the diminution of salt in the water. A few birds are seen, probably because they can find more nourishment than in the sea. It is difficult to make any point in the vicinity of the Kongo, owing to the irregularity of the currents and want of observations due to the generally overcast condition of the sky.

Rollers.—A day or two after the new moon, from May to September, especially during the period of "smokes," a very heavy swell sometimes

sets in along the whole coast from latitude 3° to 15° S., and renders the open bays dangerous to remain at anchor in, where the water is shallow. On such occasions it is generally calm, but the force of wind never exceeds a light breeze, and thus a vessel can easily warp outside the heavier rollers by means of a small hawser. It is better to ride with a kedge anchor and hawser, as a chain cable would be liable to snap. During the season of the rollers, landing on the coast can only be effected by surf boats.

In the season of the rollers, therefore, and especially at the time of full and change, vessels should avoid anchoring in shoal water, or if they do so, should be prepared to get away on the first indication of danger. The approach of the rollers is announced by considerable surf on the beach; the sea breaks on the headlands of the bays before any swell is perceived inside; while from the masthead there may be seen large waves in the offing, like ridges on the surface of the water. Along the whole coast, excepting in the bays where landing is easy, communication with the shore is always very difficult, and frequently impracticable for ships' boats on account of the heavy surf breaking on the beach.

As a rule, vessels should not anchor on the open coasts in less than 7 fathoms, nor off Padron point in less than 10 fathoms, on account of the swell, the undulation of which often assumes a very angry appearance when in a less depth of water; the swell gets up without warning, and is heaviest during the months of the South Atlantic winter, and at the full and change of the moon.

Bank of soundings.—The exact breadth of the bank of soundings has not yet been ascertained, but there is reason to suppose the depths increase regularly for many miles from the land. Along the coast the soundings vary from 7 to 10 fathoms about 3 miles off shore, but inside this line many shoal patches may possibly exist.

Off cape Lopez the 55-fathom boundary line is about 8 or 10 miles from the coast, but similar depths may also be found close to the cape on its western side. From this position, the bank extends further out on advancing to the southward, and off the Fernan Vaz river it attains a breadth of 25 or 28 miles, which it retains as far as cape St. Catherine; thence the boundary line of the above depth retreats from the coast until on the parallel of Pedras point it attains a breadth of 48 miles; and thence would appear to run parallel to the coast as far as the bay of Loango, off which 60 fathoms are found 50 or 55 miles off shore. At a distance of 80 miles to the westward of Padron point bottom at 102 fathoms was obtained, and 220 miles off the same point as much as 1,956 fathoms.

The prevailing nature of the bottom near the shore, as far as the depths of 10 or 11 fathoms, is mud; but further out is found gray muddy sand, sand and gravel, and sand mixed with coral; this last kind of bottom is found more in the neighborhood of the Kongo river. It is only in some

few places that the bottom is rocky, and care should be taken to preserve a good offing in such localities. Throughout the whole extent of the bank of soundings, the water shoals very gradually toward the shore, and, as a rule, vessels can coast along the land from 2 to 3 miles off without fear of danger and anchor in any suitable depth.

Temperature.—The temperature of this part of the coast is much lower than in the bight of Benin. Taking Lagos and the Kongo, places equally distant from the equator, the temperature off the former river averages 7° higher than that off the latter; and this difference in favor of the Kongo may be attributed to the current of cold water coming from the southward.

CHAPTER XVI.

PADRON POINT TO GREAT FISH BAY.

The coast.—From Padron point to Dande point the distance is about 155 miles in a SSE. direction. The intervening coast is unusually straight, the greatest depth to which it falls back to the eastward being 13 miles, at Funta bay; the land throughout is of moderate elevation, though higher than that treated of in the preceding chapter, and is in some places wooded, while in others the bare hills are crowned with isolated clumps of trees. It also becomes more rocky at its base, and in some places presents reddish cliffs, surmounted inland, chiefly toward the south, by a range of hills. The soundings along this portion of the coast are also less regular, and depths of from 4 to 6 fathoms extend a long way off.

Cape Deceit.—Three miles SSE. of Padron point red cliffs appear and extend for many miles. Very little vegetation is seen on their summits; within, a table-land runs parallel with the coast, and forms a double continuous chain. From the sameness of these reddish cliffs, as far as Snakes head, there are no landmarks. At the distance of 20 miles S. 28° E. (S. 10° E. mag.) from Padron point is a slight projection known as cape Deceit, which probably derives its name from the fact of its reddish cliffs being mistaken for Padron point. The cape is known as Enganador on the French charts.

Margate head.—From cape Deceit the coast curves gently inward and forms a bay, the southern point of which is Margate head. This point, situated 8 miles from cape Deceit, forms a round projection with rocky base, and crowned by a moderately high hill, and from it commences the high land, which continues to the southward nearly as far as Funta bay, 33 miles to the southward.

Vesuvius shoal.—A little over 3 miles S. 53° W. (S. 71° W. mag.) of Margate head is a shoal whose 4-fathom boundry is $\frac{5}{6}$ mile in length NNW. and SSE., and $\frac{1}{3}$ mile broad, with the shoalest water $2\frac{1}{2}$ fathoms near the center. Within the shoal an extensive bank runs out from the shore between Margate head and the coast $1\frac{1}{2}$ miles to the southward, and assumes the form of a triangle, whose apex, with 3 fathoms water, is $1\frac{1}{6}$ miles distant from the inner edge of Vesuvius shoal, with $4\frac{1}{2}$ and 5 fathoms water in the channel between.

On this shoal there are several very shoal patches, on one of which, with only 6 feet water, H. M. S. *Hydra* touched in 1859. It is, therefore, absolutely necessary to preserve a good offing when passing this locality, and not shoal the water under 8 fathoms.

Mankwe Grande.—From Margate head the coast again falls back into a sandy bay, with a rocky headland near its center, which terminates southward in a point moderately high. This point marks the entrance of a river, about a mile northward of the south point of the bay, which is 10 miles distant from Margate head, and known as Mankwe Grande. This latter point shows some lofty cliffs, surmounted with shrubs and overlooked by a hill, the top of which is rounded and bare. Within Mankwe Grande point, is a most remarkable clump of mangroves, which can be seen from seaward for a distance of 15 miles, and serves to point out the position of the factory known as Cabêça de Cobra and Mankwe Grande.

Two miles north of Mankwe Grande is Massemodom factory, between which places shoal water is said to extend for a distance of $2\frac{1}{2}$ miles from the shore.

Snakes head.—The slightly salient point between Cabêça de Cobra point and Mankwe Grande, and marked Snakes head on the chart, is very indistinct in itself, and only recognizable by the adjacent clump of trees which serve as a mark for Mankwe Grande.

Reported shoal.—A spot with $2\frac{1}{4}$ fathoms has been reported to exist, about 6 miles from Margate head and Mankwe Grande point, and west about 3 miles from the rocky headland, in the middle of the bay south of Margate head. This shoal, if it exists, is surrounded by depths of 5 fathoms, and caution should be exercised when navigating in this locality.

Factories.—There are two Portuguese factories at Kakongo, at the foot of a hill in latitude 6° 47′ S.; they are not easily discernible. A short distance southward there is a clump of trees. Five miles south of Kakongo, are the factories of Kinzao, two of which are whitewashed; and 5 miles south of Kinzao, and 4 miles north of Moculla, is Missanga factory; good water may be obtained there.

Between Kinzao and the point north of the entrance to Funta bay, shoal water is said to extend one mile from the shore.

Funta bay.—From Mankwe Grande point the coast trends in a SE. direction, $22\frac{1}{2}$ miles to the north point of Funta bay, or Bahia Fonda in latitude 6° 56′ S., the shore between presenting an uninterrupted sandy beach for a distance of 16 miles. Behind this beach may be seen some rocky cliffs overtopped by bare rounded hills. About $6\frac{1}{2}$ miles north of the bay, the sandy beach is interrupted for some miles, and the cliffs approach the water's edge, but soon after the sandy beach reappears, and continues as far as the north point of Funta bay, into which runs Lelundo

river, the entrance of which is indicated by some clumps of trees close to the beach.

The reef, said to extend from the north point of the bay, has no existence. Depths of 2¾ fathoms were found all round the point at the distance of 200 yards, increasing regularly toward the offing. The bay is not deep and affords no shelter, being open to the SW., and thus exposed to winds from seaward.

Bank.—A long narrow bank, with 4½ fathoms over the whole of it, is shown on charts as extending parallel to the coast abreast of Funta bay, with its northern extreme bearing about west from the entrance to the Lelundo river; it is 9 miles long and about 2 broad. A channel 2½ miles wide, having a depth of 6 and 7 fathoms, separates it from the reef which runs off the north point of the bay.

This bank must be carefully avoided during the season of the rollers on this part of the coast.

A depth of 8 fathoms was the least water obtained when crossing the position assigned to this bank. The factory north of Moculla was steered for, bearing about east. Discolored water was observed southward of this line.

Moculla.—About ½ mile south of Lelundo river are the four white factories of Moculla. In approaching Moculla, the water should not be shoaled to less than 5 fathoms until the factories bear N. 83° E. (S. 79° E. mag.), when they may be steered for and a berth taken in about 3½ fathoms. There is a depth of 3 fathoms close in to the factories.

Supplies.—Vegetables and fresh meat are occasionally to be procured.

Landing is difficult during the months of June to September; it must not be attempted in ship's boats.

Couza river.—From the entrance of Lelundo river the coast trends southward for 16 miles, and for a distance of 8 miles presents a sandy beach, after which low rocky cliffs reappear as far as the river's mouth. These cliffs are intersected by ravines, probably the beds of torrents, and assume a yellowish red appearance, contrasting strongly with the blue tint of the sea and with the verdant level of the country behind them.

A little in shore of the northern end of these cliffs is a moderately high hill, known as Funta mount, with some low trees on its summit; it is the last prominent elevation rising above the line of coast as far as Couza river.

Couza river may easily be recognized by the tall trees at its entrance, especially on the right bank of the river, known as Palmas point; and their dark hue contrasts strongly with the yellowish tint of the cliffs on the left bank. The south point of entrance is skirted by a bank which runs out 1½ miles; and southward of the river the low cliffs again appear, but less elevated and flat, with some thick clumps of trees sprinkled on their level summit. Eastward of the river mouth is a group of hills, the

highest and southernmost being Couza hill. The entrance into Couza river is only available for small native flatboats.

Ambrizette.—This factory station, consisting of five or six warehouses, is situated about ¾ mile southward of Couza river, on the rising land stretching toward the Foreland bluff. Coming from southward, the factories are not seen until they bear NE. by N. Ambrizette is the outlet for the ivory trade. The ivory road starts from Stanley pool, passes through São Salvador, and debouches here.

Anchorage.—The best anchorage is off the river in 5 fathoms, with the English factory bearing S. 63° E. (S. 45° E. mag.). Southward of this line the bottom changes from sand and mud to rock and stones, and shoals considerably. There is a rocky shelf with 4 fathoms on its outer end, extending a mile seaward between the factories and the bluff, to clear which the river must be kept open. The swell is uninterrupted, causing rolling and making the anchorage uncomfortable.

Buoy.—A conical buoy, red, moored in 4 fathoms, marks the in shore limit of the in shore anchorage off Ambrizette; the best anchorage is close to the buoy.

Supplies.—Nothing but a few fowls can be obtained. Some little distance up the river tolerably good water can be found, but it is necessary to employ the native pirogues in order to cross the bar safely.

Harbor light.—A harbor light is exhibited from a flagstaff at the factories at Ambrizette. The light is a fixed white light, and is shown at an elevation of about 35 feet above high water.

Foreland bluff.—This headland lies about 5 miles south of Couza river, and is a high cliff covered with herbage, projecting seaward when seen from the southward, but less prominent when viewed from the north. Within the headland rises a group of hills, the southernmost and highest of which, from its flat summit, is known as the Table of Juma, and is not only the best mark for the locality, but may be easily recognized from a distance of 25 miles. In passing the bluff, keep an offing of 2 miles to avoid the shoal extending about one mile from the shore.

Light.—A light is exhibited from near the extreme of Foreland bluff. The light is fixed white, shown at an elevation of 78 feet above high water, from an iron standard on a white stone pedestal, and should be visible from a distance of 12 miles. A small white dwelling is situated close eastward of it.

Juma bay.—South of the bluff the land falls back and forms Juma bay, a slight indentation, within an opening of 5 miles. The cliffs continue for the 3 miles south of the bluff, high and slightly rolling, and are succeeded by a sandy beach, extending to the south point of the bay. The Ambrizette river flows into the northern part of the bay, and appears to

run to the eastward. It is ¼ mile wide at the entrance, which is, however, barred with sand, like most of the rivers on this part of the coast.

Anchorage can be obtained in Juma bay, in various depths, but it is not good, the ground being foul, while a heavy swell is generally setting in causing much surf on the beach. Landing can not be effected with a ship's boat, which should be kept at the back of the surf until a canoe comes off. The neighborhood of Juma bay abounds with fish outside the depth of 9 fathoms, the best depth for fishing being 18 or 20 fathoms, coral and gravel.

Caution.—Between Padron point and Foreland bluff, a distance of 80 miles, the water is shoal near the shore, and the depths of 4 to 6 fathoms extend a long way off. Abreast of Funta bay, as previously remarked, there is a reported bank 9 miles in length, with only 4½ fathoms on it, with deeper water inside, while not more than 10 fathoms are found at the distance of 12 miles from the land. Great caution, therefore, is necessary, and the hand lead should be in constant use when approaching or sailing along this part of the coast, as there may be shoaler water than the charts show, and when in shallow water rollers often come on without warning. Rollers frequently break off Ambrizette in 5 fathoms.

Double Headed cliff.—From Juma bay the general direction of the coast is SSE., and the shore is bold and cliffy, with from 8 to 10 fathoms water at 2 and 3 miles off shore. The shore consists of high white, tree-crowned cliffs, forming a serrated outline at their base, with sandy coves between. At the distance of 14 miles south of Juma bay is Double Headed cliff, a slightly projecting point, near the north point of a small bay, whose shores are low, but at its south point the cliffs rise abruptly to a considerable elevation and are distinguishable by a cross erected on their summit.

Mussera.—About 15 miles to the north of Kinsembo, are four French factories named Mussera, off which the shore is foul for a short distance. From the anchorage the pillar of the Aravat mountain bears S. 68° E. (S. 50° E. mag.).

To the north of Mussera, ½ mile from the shore, is a bank which dries at low water. Between Mussera and Kinsembo there is a depth of 8 fathoms one mile from the shore.

Anchorage.—Vessels should not anchor off Mussera in less than 9 fathoms, which depth will be found at about 2 miles off shore. Inside this depth the bottom is rocky.

Aravat hills.—Inland, and a little to the southward of Double Headed cliff, commences the Aravat hills, which run parallel with the shore for a distance of 5 or 6 miles. They are of basaltic formation, steep, and, save a little brushwood, are without vegetation; on the summit of the northern

peak, about 4 miles inland, is a remarkable column of granite. The Aravat hills are the highest elevations between the Kongo and Loanda.

Granite pillar.—The lofty granite pillar already alluded to is believed to be of natural formation, though from the sea it has the appearance of being an artificial erection. It is very conspicuous from seaward, whence it may be seen 18 or 20 miles, and is therefore an excellent landmark for this part of the coast.

The pillar was visited by Commander Lowther, R. N., in 1867, and is thus described: "It is the chief landmark about here, and is situated about 8 or 9 miles from Kinsembo, and I think about 5 miles in a straight line from the shore. I estimated the height of the pillar, including the stone on which it rests, to be over 60 feet. The pesdestal is of an irregular oblong shape, 27 feet long and 22 feet high; the top is very uneven, with several smaller stones on it.

"The pillar is at the east end of the pedestal, and from below looks as if it could be pushed over. It tapers slightly towards the top, and is about 40 feet in height. By lying down you can look under it, and it is then seen to rest on three points, one on the north end and two on the south. All the neighboring hills are covered with huge blocks of the same kind of stone, viz, a pink kind of granite, extremely hard, consisting chiefly of feldspar, a little clear quartz, hornblende, and very little mica."

Kinsembo.—At the distance of 6 miles south of Double Headed cliff, the cliffs, which are more or less continuous from Juma bay, terminate at Kinsembo point, and are succeeded by a sandy beach for 4 miles, while beyond, at the distance of 2 miles, is the Docé river.

Anchorage.—There are no known dangers off this place, and the anchorage is good and nearer the shore than is usually the case along this coast. In 1867, H. M. S. *Dart* was anchored in 11½ fathoms, mud, about 1½ miles off shore. In 1890, the *Swallow* anchored in 7½ fathoms, fine sand, with the granite pillar N. 5° E. (N. 23° E. mag.), and the flagstaff at Kinsembo S. 44° E. (S. 26° E. Mag.).

Landing is bad, but there are plenty of surf boats belonging to the factories, manned by Kru and Kabenda men.

Supplies are rather uncertain; but shellfish, fowls, and deer may be obtained, but prices are high.

Villages.—To the eastward of Kinsembo point, a short distance inland and on the southern slope of the Aravat hills, stands a village and some large barracoons belonging to the Portuguese, while a little to the southward abreast the sandy beach already referred to is another village and other barracoons. This village, Kinsembo, stands 2 miles to the northward of Docé river, and is very conspicuous, from the fact of the conical-shaped houses being much lighter than the dark trees in the background.

The land in this locality is of a yellowish hue and contrasts strongly with the green country to the southward of the Docé river.

Factories.—The trading factories of Kinsembo, which are whitewashed and conspicuous, stand on the summit of a bluff (Two Tree point), at the foot of and on the north side of which the Docé river enters the sea.

Docé river is apparently an insignificant stream, and appears partially barred by sands; the north point of the entrance is low and wooded. The south point of the river is high, and composed of a perpendicular whitish cliff, on the summit of which are two palm trees, about 200 yards apart, and hence the name, Two Tree point. This point is easily distinguished by the trees surmounting the cliff, which is only about a mile in extent, and is succeeded by a sandy coast as far as the Lozé river, a distance of 5 miles.

Landing.—From January to June the Docé river enters the sea; the landing is then made by entering the the river and landing at the factories. During the rest of the year, the river is closed by a barrier of sand. Good landing can be effected on this barrier by means of surf boats; ships' boats should never be used.

Fish.—Off the coast about Kinsembo there are plenty of fine fish.

Ambriz bay.—The northern boundary of this bay, Lozé point, is somewhat ill defined, being a low sandy point, skirted by a bank on which the sea always breaks; it lies 5 miles to the northward of Ambriz head, which is a high, white, perpendicular cliff, forming the southern extremity of the bay. This cliff when first seen from seaward, makes like three wooded hummocks, and as the land near the shore for some distance to the northward is low, the head, especially in misty weather, assumes the appearance of being isolated.

Into the bottom of the bay flows the Lozé river; it is an unimportant stream, the position of which is marked by some unusually bright-green lofty trees and a wooded hillock; the river is barred, and will scarcely admit small boats; but within the mouth there is a depth of 12 feet, and thence it is said to be navigable nearly to its source. There are numerous villages on the banks of the river.

On the summit of Ambriz head are several factories.

Supplies.—There is no native village on the shores of the bay; water is scarce, but fresh provisions may be obtained from the interior by giving timely notice. The trade consists of coffee (of which this is the principal place of export), ivory, skins, wax, gum copal, and a quantity of copper ore from the mountains of Bembe, some distance inland, the products of which are readily transported to the sea by means of the Docé and Lozé rivers.

Light.—A fixed white light elevated 34 feet above the ground is exhibited at Ambriz, visible in clear weather from a distance of 7 miles. When the factory lights are burning, the light can be made out with difficulty.

Semaphore.—A semaphore has been established here. Vessels can communicate by the International code of signals.

Mails.—There is a Portuguese steamer monthly.

Pier.—At the north side of the town and under the highest part of Ambriz head is a small pier, alongside of which small native craft sometimes lie. In August, 1889, the pier had become unserviceable.

Buoy.—A red can buoy, in 7 fathoms, is placed off the NW. extreme of the reef extending from Ambriz head. The buoy lies about 600 yards from the reef and about 1½ miles N. 40° W. (N. 22° W. mag.) of Ambriz head. Not reliable.

Fish do not frequent the bay, save in the morning at the entrance of the river, where the seine may be used with advantage; but 12 miles off shore there are good fishing grounds.

Climate.—Inshore of Ambriz head there is much marshy ground extending several leagues inland, which renders Ambriz bay very unhealthy; the sea reaches it at spring tides, and it abounds with fish. Sea birds also collect there in vast numbers. At night the coast is generally covered with a dense fog or mist arising from the marshy land, and fills the lower strata of atmosphere, leaving the sky above perfectly clear. The dews are abundant, and the east wind is comparatively cold.

In July the thermometer shows 66°, and the cold is more sensibly felt on shore than in the roadstead. In January it ranges from 77° in the morning to 82° at 3 o'clock p. m.

Directions.—When approaching Ambriz bay from the northward, the Aravat hills, the granite column, and Two Tree point are admirable marks; but when approaching Lozé point care must be taken to keep an offing of at least 2 miles, in order to avoid the fringe reef around the point. The settlement may be steered for when bearing S. 69° E. (S. 51° E. mag.). The bay is an open roadstead, with a bottom of foul ground consisting of patches of rocks; the best anchorage is abreast the mouth of the river in 9 or 10 fathoms, mud, with Ambriz head S. 69° E. (S. 51° E. mag.); the Lozé river N. 72° E. (east mag.), and Two Tree point N. 12° W. (N. 6° E. mag.).

When coming from the southward be careful to preserve an offing of 3 miles from Ambriz head, in order to avoid the bank which is said to extend along its western side 2 miles seaward, and thence 2 miles northward. On this bank the sea frequently breaks although there are depths of 4½ and 3½ fathoms on it, and therefore the place should be avoided even by small vessels.

Landing.—In order to land from the above anchorage make for the entrance of the river, but on no account attempt to cross the bar, as it is treacherous and therefore to be avoided; when within 100 yards of the beach pull along shore southward, to the northern extremity of the

cliff of Ambriz head, which affords good shelter, and comparatively easy landing.

It is necessary to follow the above instructions, because on the bank off Ambriz head, notwithstanding the depth of water, there is sometimes a sufficiently heavy swell to capsize or swamp a boat, and during the continuance of rollers, the sea breaks along its whole extent. During heavy rollers no communication can be effected with the shore.

Angola.—The general government of Angola, or Lower Guinea, comprises a territory on the African coast, south of the equator, of about 17,000 square leagues area, the population of which, reputed to be under Portuguese dominion, does not appear to exceed 660,000 inhabitants; it extends from the Lozé river (Ambriz river, according to Portuguese authorities) to cape Negro, and about 300 miles in the interior, where it includes the countries of the Moluas, Jaga Cassange, Dala Quicua, Humbe, and where Jaga Cassange, a town of 30 or 40 houses, marks the extreme eastern limit of its dominion.

It is divided into two provinces, Angola on the north and Benguela on the south; the two districts of Ambriz and Mossamedes belong one to the first and the other to the second.

Population.—The negroes of Lower Guinea are olive-colored, hair woolly and inclining to the red, lips not very thick, and stature small; their language, the *bunda*, is quite sonorous. Those living under the Portuguese domination have the reputation of being cowardly, lazy, and of but little intelligence, though they are acquainted with a few of the mechanical arts. As a rule, they wear no clothing except a piece of cotton cloth around the loins, or sometimes over the shoulders, but are extremely fond of decking themselves in feathers, shell and bead necklaces, and brass or copper rings. On the coast, even of the Portuguese territory, many tribes preserve their individuality; the tribes near the Benguela coast are the wildest.

Products.—The soil on the Angola coast is, in general, mountainous, sandy, stony, and sterile; the lower clay lands bordering the streams and rivers are of great fertility; the high plateaux of the interior are rich in mines of all kinds, and much of the land there is susceptible of varied culture. The mineral kingdom includes copper, iron, lead, tin, quicksilver, salt, saltpeter, sulphur, petroleum, and coal. The vegetable kingdom produces coffee, sugar, cotton, corn, wheat, rice, manioc, anise seed, tobacco, palm oil, castor oil nuts, earthnuts, indigo, orchilla, gum copal, and wax. There is an abundance of woods useful in building and cabinet work, as well as rare dyewoods; the *boabab* is remarkable for its large size. Cattle and pigs are found well in the interior; and in Benguela the beeves and sheep are of extraordinary growth; horses are scarce.

Climate.—The climate of that portion of the coast between Padron point and Palmeirinhas point, though unhealthy, yet contrasts favorably with places within the same parallels on the eastern coast of the African continent.

Along the coast of Angola, the weather is generally fine throughout the year excepting during the months of March and April. Nevertheless it is distinguished by two seasons, the good commencing in May and ending in October; the remaining portion of the year being known as the bad season. During the fine season, the weather is generally cloudy, principally in the morning.

The bad season commences in November and ends in April, and during the first four months of this period, the sea breeze blows fresh from south to west, and sometimes even as far round as WNW., thus facilitating navigation along the coast. In November and December slight showers fall during the morning when the wind is southerly, but on its hauling round to the SW. the weather improves and sky clears.

The sickly season continues through September and October, and afterwards through January and February. This is occasioned by the intense heat which the sun occasions during its passage through the parallels from the equator to and from the tropic of Capricorn, when the weather becomes most oppressive. The most serious diseases are dysentery, fever, ague, and those of an inflammatory nature; and it has been remarked that people whose duties compel their constantly being afloat are those who are most frequently attacked.

March and April are the two worst months for rain and storms; they are also the hottest months, during which the thermometer sometimes attains the height of 85° in the shade. The rain continues as long as SE. winds predominate; they are generally fresh and bring with them squalls off shore. At this season, the sea breezes are less regular and very light.

The winter season is from June to September, and is considered the most healthy. During this period the atmosphere is quite clear from about 10 a. m. until sunset, with cool refreshing breezes, and the thermometer varies between 73° and 66°. This is also the harvest season, when the rains have fallen at the ordinary time. The rains, however, are in general not so heavy here as near the equator; neither are the winds so high nor the thunder so frequent or loud.

Diseases.—The most serious and prevalent diseases are dysentery, fever, ague and those of an inflammatory nature. Smallpox, every now and then is severe among the natives, although it does not attack Europeans. The latter, to enjoy good health, must lead regular lives and avoid as much as possible intoxicating liquors:

Winds.—The winds and weather off the coast between Padron point and Palmeirinhas point are thus described. In May the SE. winds prevail, and

follow the line of coast; they are perhaps the regular trade winds, which during this period of the year generally obtain the mastery over the usual SW. wind, and are probably analogous to the harmattan, north of the line. After this comes the cool season, which continues until September, and during this time the winds are usually light from SW. during the day, and southerly and southeasterly at night, with a considerable amount of calm.

During the calm weather, the atmosphere is generally thick or smoky, but, though it lessens the boundary of vision, is neither disagreeable nor unhealthy. These, being the winter months in the South Atlantic, the swell and surf are much heavier than during the other portion of the year. The age of the moon has much influence on the swell, which is perhaps greatest at the full and change during the mouth of August.

About the middle of September the weather changes, and a steady breeze sets in from the SW., lasting night and day, and may be depended on until the beginning of December, when it becomes fitful and unsteady, with occasional calms; though 20 miles from the coast the SW. wind continues to prevail.

From November to February inclusive the breezes are fresh from SW., but occasionally veering round to WSW., and even west. The sea breeze sets in between 10 and 11 a. m., and falls during the night; it is replaced toward midnight by a light land breeze which varies from SSE. to ESE., and continues until 8 or 9 a. m. However, the land and sea breezes on this coast are not very regular, and therefore not to be depended on. In the months of June, July, and August, thick fogs commence at night and last until the forenoon of the following day.

Sometimes there are appearances to the eastward of a coming storm, attended with lightning, but they seldom bring any wind to the coast; on the contrary, the wind generally falls and terminates in a calm. At night these appearances are seldom witnessed after 10 or 11 o'clock, and after their dissipation, the light land breeze continues through the night. These storms, however, must be felt in the interior, and cause great rain to fall, for the rivers commence to rise at the end of October, and continue to throw out vast quantities of water until February.

Currents.—The general set of the current south of the Kongo river is alongshore to the northward at the rate of one mile an hour; but it is very irregular, both in direction and velocity, for sometimes, between October and May, but principally in March, April, and May, the direction of the current is completely reversed, and is found setting south, and sometimes SE. This occurs generally after the rains and northerly winds, but can only be regarded as of an exceptional character; this abnormal current continues for two or three days, but seldom exceeds a week's duration. During calms especially, the currents are very irregular, and not to

be depended on, as sometimes they run contrary to their usual direction, and in the month of July have been known to set to the SW.

About Loanda and Palmeirinhas point the current has been known to set 15 or 20 miles a day to the eastward, or directly on the shore; and although this indraft is not constant, it is by no means unfrequent. In running from the southward toward the Kongo river during the night, vessels constantly overshoot their distance, and find themselves in the Kongo stream.

H. M. S. *Philomel*, when about 10 miles to the southward of Loanda, was drifted toward the coast in the month of October, 1854, the current setting her to the southward about 30 miles between noon of the 19th and the midnight following. The current on this coast usually sets to the northward, and a southerly set is most unusual, particularly with such velocity.

In June, 1863, H. M. S. *Griffon*, was set during a calm from cape Palmeirinhas to Dandé point, a distance of 35 miles to the northward in 10 hours.

Rollers.—The rollers along the coast of Angola, though very troublesome in open bays, are not dangerous to vessels riding with a long scope of cable; but in order to avoid the disagreeable rolling which invariably ensues, it is better, if possible, to stand out into the offing as soon as they commence. This phenomenon generally takes place about the time of full and change, and the rollers are always greater when they set in soon after the event; but usually they occur two or three days after full and change, and are more or less violent. It is difficult to assign any particular period for the rollers, as they are experienced throughout the year, but they happen more frequently from April to September.

Tides.—Along the coast of Angola the tide rises from 5 to 6 feet; but the ebb is little felt, as it is overcome by the general current. In bays, however, it is perceptible on ships during a calm, or with very light winds.

Little Mazula bay.—From Ambriz head to Dandé point, the distance is 37 miles S. by E., and between these points are several remarkable hills 10 or 12 miles inland known as Mazula hills. Little Mazula bay lies SSE., 8 miles from Ambriz head; a small stream of the same name falls into the head of the bay which is barely a mile across between its rocky points. The village of Little Mazula lies abreast of the bay, off which there is anchorage in 7 or 8 fathoms. At the distance of 3 miles NE. of the bay is mount Bamba, a hill with a rounded summit and sloping sides, which appears detached from the other elevations in the locality, when bearing N. 72° E. (east mag.). The shore presents an arid appearance, with an occasional clump of trees.

Mazula bay, or Great Mazula bay, lies about 17 miles southward of Little Mazula bay, the coast between being formed of steep white cliffs of uniform height, fringed nearly the whole distance with a reef extending a

mile off shore, and terminating to the southward at Onzo river, which flows into Mazula bay. The mouth of the river is indicated by a deep fissure in the cliffs, which shelve down on either side, and the valley thus formed is filled with a mass of dark verdure. Above the cliffs, of which the shore is composed, is a line of hills irregular in outline running parallel, and close to the shore; while about 10 or 11 miles in the interior, the Mazula hills, which are more peaked, form an excellent landmark. The village of Great Mazula is seen from seaward, as well as some factories. Anchorage may be had in the bay in 8 or 9 fathoms water.

Lasina river.—From Mazula bay, the coast preserves its cliffy character for a distance of 8 miles in a SE. direction to the mouth of the Lasina river, which is distinguishable by masses of lofty trees which line the shore for some distance, and form a strong contrast with the red color of the land.

Dandé bay.—The north point of Lasina river is also the northern extremity of Dandé bay, its southern boundary being Dandé point, which lies S. by W., 8 miles from the former. The bay between these points falls back 2½ miles eastward, and is divided into two unequal sandy indentations by Bluff point, high and rocky, 4 miles from Dandé point. This intermediate point appears perpendicular when seen from SW., while beyond the sandy beaches of the two bights rise a line of hillocks, with trees in the hollows.

Dandé point in latitude 8° 28′ S. at the southern extremity of the bay, is the sloping base of a steep lofty cliff, which, from a distance, makes like a bold headland. These cliffs continue eastward for a distance of 2 miles to the left bank of Dandé river, whose entrance is marked with trees. The river admits vessels of 100 tons, and is said to be navigable by vessels of moderate draft some distance above the town of Dandé, the most northern of the Portuguese settlements, situated on the left bank of the river, about 20 miles from the entrance. The Central African Company have established a trading station at Cachito, some distance up the river. There is considerable trade between this river and Loanda.

There is anchorage off the mouth of the river in from 6 to 8 fathoms water.

Cyclops shoal.—In 1849, H. M. S. *Cyclops* grounded on a sandy shoal, 1¾ miles off shore, with the following bearings: Dandé point about S. 37° W. (S. 55° W. mag.); Bluff point N. 60° E. (N. 78° E. mag.); and Dandé river S. 30° E. (S. 12° E. mag.).

Bengo bay.—From Dandé point the coast trends S. by E., for a distance of 8 miles to Spilimberta point, the coast consisting of high red and white cliffs, thence the shore falls back SE. by S., and preserves its cliffy character 6 miles further on, to the commencement of the sandy beach of Bengo bay. From Spilimberta point to cape Lagosta, the SW. point of Bengo bay, the

distance is 10½ miles SSW., and from this line, the bay falls back to the SE. a distance of 6 miles.

The shores at the head of Bengo bay consist of a low beach, with hills a short distance inland, extending from the northward round the bay to Bengo point, which lies SE., about 3 miles from cape Lagosta. In the depth of the bay, 5 miles from Bengo point, the Bengo river flows into the sea, and the position of its mouth may be known by some trees on the beach, as will as by a high hill to the eastward. Near the beach, midway between the river and Bengo point, is the town and fort of Bengo (Cacuaco), whence the markets of Loanda derive their supplies.

Anchorage.—The bay is clear of any known danger, and much frequented by shipping, in order to avoid the anchorage dues at Loanda, which are said to be very high. The soundings diminish gradually toward the shore, but are deepest on the south side. Anchorage may be had in 14 fathoms, with cape Lagosta S. 26° W. (S. 44° W. mag.), and Bengo fort, S. 18° E. (south mag.); also in 16 fathoms within a mile of the cape; and further in the bay in 7 fathoms with Bengo fort bearing S. 18° E. (south mag.).

This anchorage is useful to a ship proceeding to Loanda if overtaken by night or during a calm; and vessels are able to take advantage of the land breeze in the early morning, and thus facilitate their reaching the anchorage in the harbor of Loanda.

Directions.—In making Bengo bay from the westward, vessels should keep 3½ miles north of the parallel of cape Lagosta, and steer in such a way as to bring fort San Pedro, situated in Loanda bay, in line with a country house (Quinta) in plain sight on the summit of a cliff in the same bay; this house is 22° E. (S. 4° E. mag.) of the fort. When on this line the vessel will have passed to the eastward of the extremity of a bank which prolongs Loanda island to the northward, and may steer for a suitable anchorage in Bengo bay.

Cape Lagosta (Lobster cape) is a perpendicular cliff of a yellowish tint, crowned with trees; it separates Bengo bay and the port of Loanda; at its base are black rocks above water, but the point is steep-to and may be approached within 400 yards. It is distant 7 miles from Bengo river, and the land between is low at the bottom of the bay, but commences to rise 4 miles from the cape, in white and red cliff's, which form, on approaching from the northward, a remarkable contrast with the low land within to the SE.

Light.—The lighthouse on cape Logosta is 32 feet high, and exhibits at an elevation of 212 feet above high water a white light.

The character of the light on cape Lagosta has been observed to be fixed and flashing every 75 seconds, as follows: Faint light, 15 seconds; bright light, 40 seconds; faint light, 15 seconds; flash, 5 seconds.

The light is supposed to be fixed and flashing every 2 minutes, and should be visible, in clear weather 24 miles.

Loanda (St. Paul de Loanda) harbor.—This port lies westward of cape Lagosta, and is formed between the mainland and Loanda island and reef. The entrance is 1⅓ miles across, and thence the space adapted for anchorage runs back 3 miles to the SW. From cape Lagosta the coast trends about 1½ miles SSW. to fort San Pedro, which is low, and formed by a cutting in the solid cliff. Its walls are of a reddish color, and it presents a double tier of guns.

Close to fort San Pedro is a cenotaph, and from this position the shore trends to the southwestward 4½ miles, as far as fort San Miguel at the NW. extremity of the town of Loanda, and of which it may be considered the citadel. Eastward of fort San Miguel 1¾ miles in fort Penedo, erected on a rock at the water's edge; and in the space between stands the lower port of the town, while the higher portion occupies a commanding position on an elevated plateau within fort San Miguel. Vessels of large size lie here in smooth water at all seasons. The anchorage is good.

Loanda island and reef.—The western side of the harbor is formed by Loanda island and reef; the former is low and sandy, about 6 miles in length, NE. and SW., with an average breadth of ¼ mile. Abreast of fort San Miguel, the island is only ¼ mile distant, and thence it extends 2½ miles NE. and is prolonged under water for a distance of nearly 2 miles by Loanda reef, with as little as 2 fathoms water, on which the sea seldom breaks, and thus renders the utmost caution necessary when approaching it on either side. The NE. point of the reef, which is reported to be extending to the northeastward and westward, is steep-to and lies N. 81° W. (N. 63° W. mag.) 1⅓ miles from the rounding of cape Lagosta, and in the space between is the entrance to the harbor.

The island of Loanda is occupied by a population of 1,300 souls, nearly one-half of whom are industrious native fishermen, who supply the city with abundance of good fish daily. There are also some houses belonging to the wealthier people of Loanda, with a number of gardens and several groves of palm trees; and as the island is under the influence of the sea breeze the atmosphere is pure and pleasant, and the place is resorted to by pleasure parties from the city.

When a high SW. wind prevails the waves dash over part of the island and drive large quantities of sand into the harbor, which is gradually filling up. Great quantities of soil are also washed down from the heights during the rainy season, so that the part which once contained water sufficient to float the largest ships close to the customhouse is now dry at low water.

Light.—A light is exhibited from a lighthouse erected in a depth of about 18 feet water, near the NE. extremity of Loanda reef. The light is

a fixed white light, elevated 40 feet above the sea, and should be visible in clear weather from a distance of 10 miles.

Beacon lights.—Two fixed red lights are exhibited from beacons erected to mark the channel for small vessels to the landing place in Loanda.

The outer beacon, constructed of stone, and showing a light elevated 20 feet above the sea, is situated at the north end of a small ledge of rocks, lying westward of fort Penedo. The inner beacon marks the wreck of a sunken vessel; and the channel is eastward of the beacons. The lights are unreliable.

Beacon.—A beacon in the form of a triangular pyramid, 19 feet high, and painted black and white in horizontal stripes, has been erected about 600 yards NE. of the Quinta house, and when kept in line with the center of fort San Pedro bearing S. 32° E. (S. 14° E. mag.) leads about 200 yards clear of the NE. edge of Loanda reef and about 700 yards eastward of the lighthouse.

Vessels entering the harbor with these leading marks in line, may haul up for the anchorage when fort San Miguel is seen well open of the NE. point of Loanda island, or with the reef lighthouse bearing N. 85° W. (N. 67° W. mag.).

Loanda (St. Paul de Loanda).—The town is not only the capital of Angola, but is the principal city of the Portuguese dominions in South Africa. It stands at the head of the bay or port of the same name, and presents an imposing appearance from the sea. The city was erected by the Portuguese in 1578, is a bishop's see, and is divided into a lower and higher town; it is of considerable extent, but the sanitary arrangements are primitive and very bad.

The lower town skirts the shore between fort San Miguel and the public gardens, and is occupied by the mercantile community. The upper town is naturally the healthier part, and in it are the commodious residences of the governor, the bishop, and public functionaries, as well as several churches, the hospital, and the cathedral now partly in ruins.

There is a well kept and conducted observatory overlooking the town from its square tower, which is painted red.

The city is fortified, and these safeguards are in a state of good preservation. In addition to the fort of San Pedro, which was erected between the years 1703–5, there is the handsome fortress of Penedo, built on the Vauban system, and consisting of an irregular pentagon, surrounded by two batteries, the upper mounting 24 and the lower 37 guns. This fortress commands the entrance to the port, the anchorage, and the road by which provisions are conveyed from the country to Loanda.

The fort of San Miguel stands on a green luxuriant elevation, and commands the town, anchorage, and island of Loanda. This fortress is also built on the Vauban system, and consists of an irregular polygon, follow-

ing the outline of the hill on which it stands. On the island side are two bastions with 16 guns, which cross fire with the battery of Do Cavalheiro, which has 16 guns.

The United States is represented by a consular agent and vice consular agent.

Population.—The population is fluctuating; it consists of about 3,000 whites and 20,000 blacks.

The Currency is principally paper; it is difficult to get gold or silver coin of any kind, and even copper is scarce.

Supplies.—The principal articles of commerce are ivory, gum copal, orchilla, and beeswax, the last named being procured in great quantities from the interior. The daily market, which should be attended at daylight, affords an abundant supply of live stock, vegetables, and fruit, which are to be obtained at a reasonable rate. Fish are plentiful, and may be caught in large quantities with the seine.

The town is supplied with water by pipes from the Bengo river. The water is thick and muddy, with a considerable amount of decayed vegetable matter, which frequently causes diarrhœa. Marine stores for refitting a ship may be purchased in the town.

The lime purchased here is of a very superior quality, and is made on the island of Loanda, where there is also a soap factory.

Repairs.—There are two gridirons in the port, but only available for very small vessels. The Government has two large work-shops in the city, where repairs of machinery and iron work are generally carried on.

Coal.—There is a coal depot on Loanda island and also west of fort Penedo, where also there is a landing pier; boats can not go nearer the town than this pier at low water.

About 4,000 tons are kept in stock. Coaling by lighters of 40 to 70 tons, of which there are six, and the coal is brought off in bags. Coaling is not liable to be interrupted but is slow.

Telegraph.—There is communication between Loanda, Dondo, and Kasengo, a distance of 200 miles; also with Bengo river.

Railway.—Railway communication was opened in 1888 between Loanda and Funda, on the Bengo river. It is being extended.

Time ball.—Fort San Miguel flagstaff is situated in latitude 8° 48′ 24″ S., longitude 13° 13′ 20″ E.

A time ball is hoisted halfmast on the staff of the observatory tower at 11h. 55m. a. m.; close up at 11h. 58m.; and dropped at noon mean time, Loanda.

It is reported that dependence can not always be placed on the accuracy of this time ball.

Mails.—English mail steamers call here every three weeks, and Portuguese twice a month.

Tides.—It is high water, full and change, in Loanda harbor at 3h. 48m.; springs rise 4¼ feet.

Semaphore.—A semaphore station has been established at fort San Miguel, and vessels can communicate by the International code of signals.

Directions.—From the northward.—On approaching Loanda from the northward, the first land recognized will be the fine bold cliff of cape Lagosta with its lighthouse, and then the fort of San Miguel, with the upper portion of the town. As cape Lagosta is neared the lowland of Loanda island, with its clumps of trees and the lighthouse on the NE. part of the reef, will be seen, and then keeping about midway between the reef lighthouse and the shore of cape Lagosta, steer in for fort Penedo and anchor with it bearing S. 29° E. (S. 11° E. mag.), and fort San Miguel from S. 55° W. (S. 73° W. mag.), in about 14 fathoms.

As the sea breeze blows right out of the harbor, a vessel has generally to work up to the anchorage, unless she has anchored overnight in Bengo bay, whence she would have the land wind in the early morning fair into port. But if compelled to work in, after having tacked off cape Lagosta and standing over toward Loanda reef, tack before fort St. Miguel comes on with the SE. end of Loando island, as the reef is steep-to, with 17 and 18 fathoms close alongside it. Then standing toward the mainland, tack before the cathedral on the hill within fort San Miguel touches the sandy point of the public gardens, as the bank is steep-to, and the water will shoal while in stays from 12 to 5 fathoms; on the other side the island shore is bold-to, and may be approached accordingly.

Ships working from the Kongo river to Loanda should anchor every night, when the sea breeze falls light, so that they may weigh with the first of the land breeze and continue on the port tack until about 1 p. m., when they should tack, and by the time the sea breeze fails good progress will have been made to the southward.

From the southward.—When approaching from the southward, fort San Miguel may be seen in clear weather from a distance of 16 or 18 miles, assuming an appearance of being white and standing on a high promontory. The island will not be recognized until much nearer in shore, when the lighthouse should be observed on the NE. end of the reef, and then from the masthead the water of the harbor will be seen within it. As cape Lagosta, fort San Miguel, and the reef lighthouse are admirably adapted for fixing the position of a vessel by cross bearings at the back of Loanda reef, no difficulty will be experienced, and when the Quinta house comes in line with fort San Pedro, it may be steered for, passing 600 or 800 yards eastward of the reef lighthouse; and with fort San Miguel well open inside of Loanda island and the reef lighthouse, haul up as high as the wind will permit, and beat up to the anchorage, which is the best along the whole coast of Western Africa southward of the equator.

In leaving Loanda for the southward, a long stretch of 50 or 60 miles off shore should first be made until the wind is brought from the NW. so as to double on the other tack Palmeirinhas point, near which the currents run very strong; it is almost impossible to double this point by making short tacks near the land.

Carimba lagoon.—The low sandy spit, of which Loanda island is the NE. extremity, extends in a general direction SW. for a distance of 25 miles to Palmeirinhas point, and incloses along its whole length an extensive but shallow lagoon, which communicates with the sea through an opening in the spit 2 miles wide, named the bar of Carimba, 5 miles SW. of fort San Miguel. It is defended by fort San Ferna Fernao on the NE. side, and was formerly an entrance into the harbor of Loando, leading round the fort of San Miguel, where at present there is scarcely sufficient water to float a canoe.

Palmeirinhas point.—The SW. part of this sandy spit is known as Careangé island, and extends from the bar of Carimba to Palmeirinhas point, where it joins the mainland, on which 2 or 3 miles northward may be seen from seaward, over the spit and lagoon, the town of Tanza. Palmeirinhas point, the southwesterly extremity of the sandy spit so often alluded to, is low and sandy, with clumps of palm trees, hence the name.

Light.—A flashing white light every 30 seconds, showing a flash of 5 seconds' duration, is shown on the point, from the top of an iron tower, 60 feet high, and is visible 15 miles. Reported irregular and visible only 8 miles.

The lighthouse, painted in bands alternately black and white, is situated 328 yards from the sea. A keeper's dwelling, white, is situated about 110 yards northward of the lighthouse.

Caution.—From the point a reef on which the sea breaks extends 2 miles off shore, and thus renders great care necessary when navigating in this vicinity, more especially as the currents appear to have an in shore tendency, for vessels are frequently found to be nearer the land than was supposed, and an additional reason for precaution is the fact that the shores of the sandy spit are very steep-to all the way to Loanda island, having from 26 to 30 fathoms alongside the beach.

Coanza bay.—From Palmeirinhas point to Malli point, the mouth of Coanza river, the distance is about 17 miles SE. by S.; the intervening land is low. Immediately within Palmeirinhas point is an indentation whose southern boundary is 6 miles distant from the point; this bight is known as Coanza bay, and may be recognized by a high dark wood in its center near the sandy beach, while in its northern part are two hills known as the Paps. There is anchorage in this bay in from 6 to 9 fathoms, oozy bottom. Further to the southward is another slight indentation, which also affords anchorage in 8 or 9 fathoms.

Coanza river.—This river, which is the southern limit of the Angola territory, is a stream of considerable magnitude, and discharges its clayey waters with such force as to discolor the ocean for a distance of 10 to 15 miles seaward. The Portuguese have several settlements on its banks, and its inner navigation, which extends far into the interior, is said to be important. From Malli point on its northern side, which is densely wooded, the mouth of the river is about one mile across, but the bar is ever shifting and frequently breaks throughout its whole extent, and is therefore extremely dangerous, especially for boats, which should never make the attempt to cross.

Small vessels, however, drawing 8 or 9 feet water, and possessing local knowledge, may cross the bar at high water, and with a smooth sea, and these are enabled to go some distance up the river, which trends NE. for about 22 miles, thence east and SE. for a considerable distance.

Two miles within the entrance on the northern bank, lake Kirinje pours its water into the river by a stream of considerable magnitude; and one mile beyond on the southern shore is the settlement of Cassanha. Calumbo on the northern shore, one of the earliest Portuguese settlements, is about 34 miles from the entrance, and Muxima on the south bank 75 miles. Beyond Muxima, a distance of 27 miles, and one mile east of the confluence of the river Lu Calla with the Coanza, is Massangano, a strong military position. The climate is unhealthy.

The settlements of Dondo and Cambambé on the north bank, about 16 miles further on, mark the limit of navigation, for a little beyond are some large cataracts and rapids; the climate is healthy and the country moderately productive. The Central African Company have four trading stations on the river. A railway has been projected from Loanda, meeting the Coanza at Barraca, nearly opposite Muxima, thence to Catumbo and Ambaca, with a branch to Dondo from Catumbo.

There is a small line of steamers running between Loanda and the Coanza.

The next settlement is Pedras de Pungo Andongo, or Pedras Negras, 5 miles from the north bank of the Coanza river; eight days' journey from Loanda. This place was the ancient capital of the kings of Dongo, and was taken by the Portuguese in 1671; it stands in a superb situation, in the midst of a country of wonderful beauty and fertility, and occupies the summit of a sandstone rock, which is inaccessible, except by a cavern through it to the fort. The last settlement on the river, 360 miles from the sea, was founded in 1838, and named Duque de Braganza; it is stated to be healthy and fertile.

Anchorage.—There is anchorage off the mouth of Coanza river in from 15 to 12 fathoms, 9 miles off shore, as well as in 9 fathoms 3 miles off.

There is also said to be good anchorage in 6 fathoms, mud, about 2 miles from the shore.

Soundings.—Between Dandé point and Spilimberta point the coast is generally steep-to, with a mean depth of about 11 fathoms at the distance of 1½ or 2 miles off shore; but the depths are much greater between cape Lagosta and Palmeirinhas point, where the depths close to the edge of Loanda island and the long sandy bank westward of Carimba lagoon vary from 25 to 33 fathoms. Between Palmeirinhas point and Coanza river, the water is not so deep, and moderate depths will be found at a considerable distance from the coast.

On the parallel of Loanda island, the 60-fathom line is 19 miles off shore, and thence decreases to about 25 fathoms, at a distance of a mile from the island shore. Off Palmeirinhas point the depths are somewhat similar, but on the parallel of Coanza river the bank extends much further off; and 80 fathoms will be found at the distance of 30 miles from the coast, decreasing gradually toward the shore.

Coast of Benguela.—The province of Benguela, under the nominal sovereignty of the Portuguese, extends from Coanza river to cape Negro. In former times this possession was rich and flourishing, but since the activity employed in suppressing the slave trade, its prosperity has greatly diminished, for with the exception of a few exports consisting of ivory, wax, gum copal, and skins, there is little or no legal commerce; and the cultivation of the land is strictly confined to the necessities of the population.

Cape Ledo.—From Coanza river to cape Ledo, the distance is 25 miles, S. by E., the intervening land being moderately high, with red cliffs facing the sea, the soundings being regular in from 7 to 9 fathoms at the distance of 6 miles off shore, the coast between being safe, and without any known danger. Cape Ledo is a high, black, rugged promontory, covered with trees apparently withered, and the land to the northward as far as Black point, a distance of 11 miles, consists of steep hills and verdant land.

The cape is easily recognized from seaward, as it is a salient point, presenting the appearance of a truncated cone, and is nearly 1½ miles long from north to south; a reef extends a short distance off the north end of the cape, but there is a depth of 11 fathoms at the distance of ¾ mile, and 2 miles off it to the westward there are 13 fathoms water.

Mastote bay.—The bight between Black point and cape Ledo is known as Mastote bay, and within the cape is a small sandy cove into the head of which falls the small river Suto.

Anchorage.—The bay affords shelter from SW. winds, though at times a heavy swell sets round cape Ledo, which causes rolling and a heavy surf on the beach. The *Bramble* anchored in 4½ fathoms with cape Ledo bearing S. 64° W. (S. 82° W. mag.), and a conspicuous tree on the hill

S. 9° W.(S. 27° W. mag.). The water shoaled gradually toward the beach, and the bay is apparently free from dangers.

No supplies were to be obtained.

Cape St. Bras.—At the distance of 16 miles SSE. from cape Ledo is cape St. Bras, which in appearance resembles the Bill of Portland, in England. The shore between the two capes forms a slender bight, bordered by remarkable white cliffs; and the soundings are regular, with a depth of 10 fathoms 2 or 3 miles off shore. On the north side of cape St. Bras is a sandy cove, where there is anchorage in from 8 to 4 fathoms, while about 5 miles NE. of the cape is the mouth of the small river Kesimi.

The cape is steep-to, with a depth of 4½ fathoms within 100 yards, and this depth continues all round the cove to a sandy spit about ¼ mile long. Inside the spit there is a beautiful little harbor about ¼ mile in extent, with depths of 2½ and 3 fathoms. In the harbor the seine may be hauled with advantage, as it abounds in various kinds of fish.

Longo point lies 18 miles SSE. of cape St. Bras, and is a bluff headland, covered with brushwood; there is a high table-land between, and in a bight to the southward of Longo point is an indentation, into which flows the Longo river. In this locality there are no inhabitants; but lions, tigers, deer, and other wild animals exist in great numbers. Along this portion of the coast there is a depth of about 10 fathoms ¾ mile from the shore.

Cape Three Points.—From Longo point SSE. about 9 miles is another projecting headland, known as cape Three Points, the intervening land being composed of high, white, and irregular shaped cliffs, excepting in the immediate vicinity of Longo river, which lies in the depth of the bay between the above points, whose entrance is well wooded. Across the bay the depths are from 10 to 12 fathoms, muddy bottom in general, about 5 miles from the shore.

Morro point, or Old Bengula head, lies SSE. 23 miles from cape Three Points, and is one of the most remarkable headlands on this part of the coast. It is very high, cliffy, and perpendicular toward the sea, and appears on some bearings as a double point, occasioned by another bluff within it. The summit of Morro point, as well as the bluff alluded to, is covered with tall straight cactus trees, which have a peculiar appearance. There is also a large village on Morro point, and some factories are established in the bay to the northward, but it is now an insignificant place.

Between cape Three Points and Moro points, the coast forms a bight, and there is a depth of 10 fathoms within 2 miles of the shore. Within Morro point the coast trends eastward for 6 miles, and thence northward to cape Three Points, the shore throughout being without any known danger. Northeastward of Morro point are several hills, known as the hummocks of Old Benguela.

Anchorage.—There is good anchorage to the NE., and under the shelter of Morro point, where the water shoals gradually from 15 and 14 fathoms, at a mile from the land, to about 4 or 3 fathoms within 200 yards of the beach. Here the water is tolerably smooth, but neither provisions nor water are to be obtained.

Cubo river.—At the distance of 10 miles southeastward of Morro point is Cubo river, a large stream said to be 300 miles in length. The position of the river's mouth may be known by the usual clumps of dark mangroves. About 3 miles southward of the Cubo is Moroa river, and 6 miles further on is the village of Kingo, where several large factories are established. Landing is very difficult along this part of the coast.

The cliffy nature of the coast disappears in the vicinity of Cubo and Moroa rivers, whose waters flow through a low wooded plain; but southward of the latter river, the cliffs reappear and continue almost without interruption as far as Lobito bay. In these cliffs there will be observed yellow spots, occasioned by land-slips. During clear weather, and particularly in December, January, and February, the summits of some high mountains are to be seen in the interior, apparently running parallel to the shore.

Novo Redondo.—At the distance of 23 miles SSE. of Morro point is the town of Novo Redondo, the coast between forming a bight of inconsiderable depth. The town is of moderate elevation, and is easily recognized by a white fort and several white houses, which show out well and may be seen from a considerable distance from seaward.

The town is considered to be the third in size and importance of the Portuguese possession on this coast; but the fort is in a sad state of dilapidation. There are about fifty white people engaged in cultivating cane and rearing sheep and pigs. Stock of all kinds may be procured, but no water. Landing is very difficult, except in surf boats, a number of which are always in readiness on the beach. The best anchorage is in from 4 to 7 fathoms, with the fort bearing east (S. 71° E. mag.).

Light.—A fixed white light is exhibited on the northern angle of the fort. It is shown at an elevation of 103 feet above the sea, and should be visible from a distance of 15 miles.

Climate.—The climate is considered very unhealthy during the rainy season.

Gunza river rises about 60 miles in the interior, and after flowing through a rich and thickly populated country, flows into the sea 3 miles south of Novo Redondo.

Reported bank.—Caution.—There is said to be a bank 3 miles westward of Novo Redondo on which a brig is reported to have struck and to have been compelled to throw her guns overboard before getting off; it would

therefore be advisable to keep an offing beyond the above distance until the locality has been better examined.

Kikombo.—From Novo Redondo the coast runs in a straight line S. by W. for a distance of 11 miles to Kikombo, situated in the depth of the bay of the same name. Kikombo point, the southern extremity of the bay, is a bluff red point, off which the 3-fathom line of a rocky shoal, on which the sea frequently breaks, extends about ⅔ mile in a NW. by N. direction. Kikombo may be known from northward and westward by a remarkable zigzag road which lies at the back of the town and leads over the mountains into the interior; this is the best and most conspicuous distant mark of recognition from the offing. There are several Portuguese factories here.

Supplies.—Kikombo is a place of considerable commercial importance, and is an excellent place for stock of all descriptions, including bullocks of a superior kind, which are obtainable at a moderate rate. There are plenty of fish in the bay, and it is also important as a watering place, there being no other between it and Little Fish bay, where water is easily procured. The watering place is a large sheet of water at the mouth of the small river Kikombo, close over the beach near the village, and here casks may be filled and parbuckled into the boat.

Directions.—There is good anchorage in the bay, excepting during the time of the rollers, which frequently occur a couple of days after full and change, when they set in so heavy as to prevent communication with the shore; and therefore it is not advisable to anchor closer to the beach than 1½ miles, if intending to remain over that time. To enter the bay from northward, the village should be brought to bear S. 21° E. (S. 2° E. mag.), or S. 10° E. (S. 9° W. mag.), when anchorage may be selected at any convenient distance.

Anchorage.—A good position is in about 5 fathoms, sand and mud, with the village bearing S. 21° E. (S. 2° E. mag.), and Red point (about 2 miles SW. of Kikombo point) just open of an intermediate point S. 21° W. (S. 40° W. mag.). There is a good inner anchorage in about 4½ fathoms with the village south (S. 19° W. mag.), and Kikombo point S. 30° W. (S. 49° W. mag.), but the anchorage inside the bay is not safe when rollers set in. Coming from southward give Kikombo point a berth of a mile on its NW. side, and select a convenient anchorage.

Kisingo.—The land to southward of Kikombo is high, and the Red point already referred to is easily recognized by the red spots which mark its SW. face. The village of Kisingo Pequeno, about 8 miles southward of Kikombo, is a mere cluster of native huts.

Landing can only be attempted in surf boats, but about a mile northward of Whales head, boats can land when the water is smooth, though, as there is no village, no supplies are obtainable.

Whales head (**Novo Redondo** of Owen) is a dark-colored point, projecting about a mile into the sea from the general line of coast, and may be identified by a remarkable piece of table-land near the beach, about 2 miles northward.

Pigeon bay.—Southward of Whales head is a slight indentation 5 miles in length, presenting a fine sandy beach throughout, and terminating southward in a rocky point. The sea breaks with considerable violence on the shore; nevertheless, vessels occasionally anchor in the bay, and trade with the natives of Kisingo Grande, which lies about a mile southward of Pigeon bay.

Tapado river.—At the distance of 9 miles southward of Pigeon bay is Tapado river, which may be identified by some vegetation in the middle of a somewhat steep ravine. Here also is a village, and there is anchorage in 8 fathoms, about a mile from the shore with the village bearing east (S. 71° E. mag.).

Logito, or Egito, river.—From Whales head the coast trends S. by W., 23 miles to Logito river, the shore throughout from Kikombo being formed of high, perpendicular, chalky cliffs, which are seen from a great distance seaward with the afternoon sun. Along the whole length of this portion of the coast a vessel may run within a mile of the cliffs without danger.

Logito river may be known by a large white house standing on the right of a deep gorge, half way up the cliff, as well as by a remarkable cliff a little southward of the entrance of the river, in form of a quoin, declining toward the mouth. There are a few houses close to the beach at the foot of the valley, and there is good anchorage in about 6½ fathoms, 1½ miles off shore, with the house on the hill side bearing S. 65° E. (S. 45° E. mag.).

Supplies.—The mouth of the river is an excellent watering place, as the water coming from the mountains is perfectly wholesome, and better in quality than at any other place on the coast; but a smooth sea is absolutely necessary. As there is generally a heavy surf, especially at the full and change of the moon, the most expeditious plan is to haul the casks off to a boat anchored outside the surf, and then raft them off to the ship. There are several Portuguese factories here, and bullocks and stock may be obtained, but no vegetables.

Anchorage on coast.—Vessels may bring up, if necessary, with the stream anchor in 30 fathoms, 10 miles from the land between Logito and Kikombo, but further to the northward the water is deeper at that distance. In working along the land during the night, soundings should be obtained with the hand lead before approaching too close; in some places between Whales head and Kikombo, depths of 7 fathoms have been found at a distance of 4 or 5 miles off shore.

Oyster bay.—Landing.—At the distance of 4 miles southward of Logito river is a large village with two factories, fronted by a sandy beach, which falls back into a bay 4 miles across between its points. In this bay the boats of coasting vessels are enabled to land, notwithstanding that the sea breaks on the beach with considerable force.

Anha.—The village of Anha stands at the mouth of the river of the same name, 15 miles SSW. of Logito river, and from the offing presents a most picturesque appearance, being situated in the midst of luxuriant vegetation. There are several Portuguese residents here, traders in orchilla. The anchorage is in 7 fathoms, with the river S. 55° E. (S. 35° E. mag.), 2 miles distant; but in consequence of the heavy surf which invariably breaks on the beach it is impossible to land in ship's boats, even under the most favorable circumstances.

Lobito bay.—This excellent and secure harbor, the best on this part of the coast, appears to have been unknown, excepting to the slave traders, until 1840. The Portuguese have established a customhouse here, but water can only be obtained during the rainy season; at other times it must be brought from Anha or Catumbela. The village on the east shore of the bay has been abandoned; the fishermen have taken up their quarters in the SW. corner of the bay, others on Lobito spit, to avoid the wind from the swamps and to reap the benefit of the sea breezes.

Lobito point, the west point of the entrance, lies about 10 miles SW. of Anha. The entrance is nearly one mile across, and thence runs back with a slight increase of width about 2 miles in a SW. direction. The beach on the western side of the bay, within Lobito point, is almost perpendicular, there being in most places 10 fathoms within 30 feet of the low water mark, and from 14 to 20 fathoms in the middle of the bay. The point is reported as extending to the eastward.

From the head of the bay the cliffs recede several miles into the interior, and thence taking a southwesterly trend, circumscribe the great plain at Benguela, and rejoin the sea at St. Philips bonnet.

Supplies.—Poultry may be obtained, and oysters are found in great abundance on both sides of the river which flows into the head of the bay. Firewood, and sometimes a supply of lime, can be procured on obtaining permission of the Governor of Benguela. Fish are abundant.

Landmarks.—From Lobito to Benguela the coast is bordered by a low wooded plain, which extends for half the distance between Catumbela cut and the first houses of Benguela. This plain, which is steep-to near the sea and on which some isolated white houses are visible, is a few yards high and forms an excellent landmark, for north of Lobito bay high cliffs are to be seen, and south of the same bay commences a naked and desert plain which reaches to St. Philips bonnet.

The cliffs to the north, bordering a more elevated mountain range, present an irregular, arched crest, especially at that end next to Lobito bay.

Tides.—It is high water, full and change, in Lobito bay, at 4h. 15m.; tide rises 5 feet. The head of the harbor is occupied by an extensive bank, which dries at low water, when the smell is very offensive.

Directions.—The harbor is not easily made out by a stranger, and a vessel might pass within 3 or 4 miles without perceiving the water of the bay over the long, low sand spit terminating in Lobito point, for from a distance the spit resembles a beach on the mainland.

Coming from windward the Catumbela cut is conspicuous, and is steering for this the wooded plain comes in sight, as well as two reddish forts at the foot of the gorge. If an anchorage at Lobito is desired, steer for the north limit of the trees and the bay will soon be sighted from aloft, over the sand spit extending in an easterly direction from the limit of the trees. Coming from the north, the wooded plain, resembling a cape, will soon be sighted; steer for it, and the entrance to the bay will shortly appear. Coming from the south, stand along the plain, and after passing Catumbela cut the wooded screen will immediately come in sight.

On rounding Lobito point, which may be approached within a few yards, the wind will generally be found to be blowing from SW. to WSW.; it will be necessary to work in, and in doing so care must be taken not to stand into less than 8 fathoms toward the eastern shore, as the water within this depth shoals suddenly.

Anchorage.—Ships should not anchor nearer than ¼ mile from the head of the bay, not only because the water becomes shoal, but on account of the unhealthy nature of the locality.

Catumbela river flows into the sea at the distance of 5 miles south of Lobito point, the intervening coast being low and wooded. The position of the river is rendered conspicuous when bearing east (S. 70° E. mag.) by a remarkable opening in the hills 4 mills inland, through which the river passes. Two forts, of a reddish white color at the entrance, also serve to point out its position. The river is said to attain considerable dimensions some miles inland.

In the rainy season the river overflows its bed and inundates a great extent of country, but in the dry season it subsides into a large stream. The river is accessible to boats, and water is easily procured; but it is said to contain injurious vegetable matter which frequently produces dysentery. A large population exists in the immediate neighborhood of the river, and many houses are visible on the shore near the right bank of the river, whence stock of all kinds may be obtained.

Catumbela being more healthy than Benguela, the place is rising in importance. Factories are established, and it is the market where the cara-

vans bring their rubber, ivory, and gum for barter. The two towns are connected by a well kept road.

Benguela bay.—About 10 miles southwestward of Catumbela river is Caboto point, the NE. extremity of Benguela bay, an indentation nearly 7 miles broad and 2½ miles deep. The shore is principally composed of a sandy beach, on which the town of St. Philip de Benguela is built, but the inland country is very high, as is also the western side of the bay, which terminates in a promontory, surmounted by a very remarkable hill crowned with trees, which from its peculiar formation is known as St. Philips bonnet, and may be recognized from a distance of 25 miles to seaward.

At a distance of ⅛ mile off St. Philips bonnet, there is a depth of only 4 fathoms; and the 3-fathom line sweeps round the bay nearly a mile off shore on the southern side and ¼ mile from abreast of the town to Caboto point, near which is a small river of the same name. Beyond this line the water deepens suddenly, increasing to 24 fathoms, about midway on a line between St. Philips bonnet and the NE. point, where is only a very slight projection.

Bank.—A bank of 1½ fathoms is reported to be on the outer edge of the 3-fathom bank fronting Caboto point, at one mile off shore, with Benguela fort bearing S. 2° W. (S. 22° W. mag.).

Benguela.—The town of St. Philip de Benguela, the capital of the province, was formerly a place of considerable trade, and only second in importance to Loanda; but from the suppression of the slave trade, the place fell into a state of dilapidation; but now it appears to be regaining prosperity, as it is stated that it is laid out in large square buildings, possesses an imposing looking church, large public gardens well laid out, and a customhouse. An old fort built principally of earth stands on the sea face of the town.

The town is situated on a marshy plain fronting the sea, which during the rainy season is almost inundated, causing the most deadly exhalations to arise. March and April are the rainy months, and are accounted the most sickly periods, but at no season of the year can the place be deemed otherwise than unhealthy. The population in 1865 amounted to about 2,400, including Europeans. The soil is perfectly barren, without the slightest appearance of vegetation, excepting near the Catumbela river.

Pier.—An iron pier about 200 feet long has been constructed abreast of the town, which much facilitates landing. There is a depth of 6½ feet at low water at extremity of pier.

Lights.—From a lighthouse on St. Philips bonnet (Sombreiro point), at an elevation of 394 feet, a fixed white light is shown, which should be visible in clear weather from a distance of 14 miles.

Two lights mark the pier at Benguela. They are fixed white and can scarcely be distinguished from the lights of the town.

Two leading lights are also exhibited. One light, fixed red, is shown from above the tunnel into the fort; the other, fixed green, from a position seaward of the church. The green light is the higher light, and both are visible, in clear weather, from a distance of 6 miles.

Entering Benguela bay at night, these leading lights should be kept in line until the buoy in the bay is reached, when anchorage may be taken up in about 7 fathoms of water.

Telegraph office at Benguela is situated in latitude 12° 34′ 43″ S., longitude 13° 23′ 55″ E.

Buoy.—A buoy, with flag, is moored off the town in 6½ fathoms for the purpose of marking the anchorage for the mail steamer.

Supplies.—The trade is confined to ivory, wax, gum copal, and skins collected from the Catumbela river, and the district extending to cape St. Martha by small sailing boats. Vegetables are to be procured in abundance, and beef several times a week. Eggs and poultry are cheap, and fish are plentiful.

Good water may be obtained from Caboto river, and some of an indifferent quality may be procured from the town, but it must be baled from wells of considerable depth, about 300 yards from the beach.

Mails.—There is a Portuguese mail steamer monthly.

Tides.—It is high water, full and change, in Benguela bay at 3h. 45m.; the tide rises 5 feet.

Directions.—When approaching Benguela bay from the northward, a conspicuous mountain is seen situated 15 miles south of the town; it is called the Agulhas mountain, and in clear weather can be seen 36 to 40 miles. The lands of St. Philips bonnet are much less elevated, and will not be seen until after the Agulhas mountain. Another leading mark for Benguela bay is the gorge of Catumbela. When coming from the southward or westward, with the high land of St. Philips bonnet or the light in sight, do not bring it to bear to the eastward of east (S. 70° E. mag.), in order to clear the low sandy point of San José, lying S. 75° W. (N. 85° W. mag.), 8 miles from St. Philips bonnet. Having passed the latter at a convenient distance at night, bring the harbor lights in line; this mark should lead to the buoy, near which anchorage may be taken in about 7 fathoms.

By day a tunnel in the middle of the fort, appearing from the sea like a day mark, brought in line with the church bearing S. 65° E. (S. 45° E. mag.), leads to the buoy.

Soundings.—The portion of the coast of Benguela between Palmeirinhas point and St. Philips bonnet is generally steep-to and without any known offlying dangers. Between Black point and cape St. Bras the

60-fathom line extends 21 miles off shore, and thence decreases gradually to 12 fathoms about 3 miles off shore. Off Longo river the 60-fathom line extends 30 miles off the shore, but off Pigeon bay the depths of 60 to 70 fathoms will be found about 11 miles from the land, and thence those depths run parallel with the coast at the same distance to abreast of St. Philips bonnet, off which the water is deep, and soundings variable, there being from 10 to 33 fathoms 2½ or 3 miles off shore.

Torta bay.—Westward of St. Philips bonnet the shore continues cliffy for 4½ miles, to point das Vaccas, and forms several snug coves where boats and small craft may lie unseen.

From point das Vaccas the shore falls back to a sandy beach, which forms Torta bay, terminating in San José point, a rounded sandy tongue; the depth of the bay being ⅔ mile. There is excellent anchorage in this bay, and within San José point is a conspicuous palm tree which is useful as a mark. This bay offers no other resources than fish, which are plentiful, and some broom stuff; no water is to be obtained.

Tides.—It is high water, full and change, in Torta bay at 3h. 30m.; the tide rises 3 feet.

Directions.—To reach the anchorage in Torta bay, in coming from the southward, after doubling San José point at a short distance, steer for the extremity of the sandy beach at the head of the bay, where it joins the rocks of point das Vaccas, and drop anchor in 14 to 17 fathoms water ⅓ or ½ mile from shore. After passing to the southward of the parallel of the palm tree from the northward, care must be taken to avoid a bank extending into the offing from the coast, on which the depths vary from 4½ to 2¾ fathoms. This patch is steep-to, and from 6 fathoms falls suddenly to 2¾; depths of 11 fathoms at least should be maintained.

Caution.—From San José point the land, assuming a rounded form, trends about SW. to Salinas point, a distance of 24 miles. Along the whole of this portion of the coast the shore is very bold, there being 10 fathoms within 200 yards of the beach. It is, however, dangerous in the extreme to approach during the night, for the beach being of white sand, and projecting so far from the high land within, it is difficult to recognize until very close. Many vessels have run on this shore during fine clear nights; it is therefore necessary to navigate this part of the coast with extreme caution, which should also be exercised in rounding San José point.

Victoria river.—Between San José point and Salinas point is the Victoria river, whose mouth is 7 miles NNE. of the latter point. The river is little better than a small creek, extending a considerable distance into the interior, with banks richly covered with vegetation.

Salinas point is rounding in form and terminates a low flat sandy plain, which extends 5 or 6 miles beyond the high lands, running parallel with the coast from St. Philips bonnet. On its extremity, about 65 yards

from the sea, is a remarkable tree resembling a sail and often reported as such. There is a reef south of it, and the water between it and Luash bay is shoal. The cautionary remarks respecting this part of the coast apply especially to Salinas point. Northward of the point, about 5 or 6 miles, a settlement has been formed for the manufacture of salt, which is chiefly exported to Benguela and Loanda.

Current.—Along the shore north from Salinas point the current sets away from the shore in a very sensible manner.

Light.—The light is a fixed white light, shown at an elevation of 69 feet above the sea, from an iron tower 59 feet high, painted black, and situated about 180 yards from the sea.

The range of visibility (about 14 miles) of this light intersects with that of the fixed red light on St. Philips bonnet, which light is visible from a distance of 14 miles.

Luash bay.—This port, about 5 miles SE. of Salinas point, is formed by the junction of the hilly country, with the low shore extending from that point.

Vessels of large draft must anchor outside in from 10 to 12 fathoms, but the anchorage is very bad in consequence of its being exposed to the whole force of the SW. winds, which create a heavy swell. Close to Luash there is a stream of water known as the San Francisco river (Copororo).

The small bay in the southern part of Luash bay, adapted for small craft, is known as Cuio harbor. There are several factories here at Cuio, the settlement on the beach. The west extreme of the rocky ridge which forms the natural mole is perforated and known as Arco do Cuio (Arch rock).

Supplies.—Meat and vegetables were easily procurable in 1889.

Equimina, or Caminha, bay.—From Luash to Elephant bay the distance is 19 miles, in a SW. direction, the intervening shore, which falls back to the southeastward about 6 miles, being high and steep, with several small sandy indentations. The Equimina river flows into a bay of the same name, about 3 miles in extent NE. and SW., with two villages, one near its center and the other in the SW. angle of the bay, with the watering place between them. The northern point of the bay is composed of a high white cliff, apparently of chalky formation, which may be seen from a considerable distance. There are three conspicuous houses, yellow and white, by which the place may be recognized. There is a Portuguese settlement in the SW. village, for the purpose of collecting orchilla, which is obtained in all the bays of the coast, and is supposed to be a government monopoly.

The bank of soundings adapted for anchorage is very narrow, and the water shoals very quickly within the depth of 20 fathoms, so that great

care is necessary not to have too much way on in coming to. A vessel may anchor in from 15 to 13 fathoms about ½ mile N. 70° E. (east mag.) of the SW. point of the bay. The anchorage is not so well sheltered as in Elephant bay. Previous to bringing up, it is recommended to send a boat to select the position of the desired anchorage.

Equimina.—The settlement consists of a group of European houses, in front of which the Portuguese flag is hoisted on a staff near the middle of a beach 3 miles in length, which has a verdant plain between high hills at its back. A short distance to the SW. of the houses are two white European houses with red roofs.

A large plantation of cotton and sugar cane, and a lime and brick manufactory, are established in the bay, employing altogether 300 natives.

Landing.—Ship's boats can generally land on the beach opposite the principal block of houses, and natives are always ready to haul them up. When the surf is too heavy it is better to land at the SW. angle of the beach.

Supplies.—Bullocks, fruit, and several kinds of English vegetables are plentiful and reasonable, and there are wells of excellent water for irrigating purposes, from which a vessel might fill up in a short time, as the supply seems inexhaustible. To the right of the bay will be seen a spring of excellent cool clear water trickling over the rocks, but not enough for a ship to water from.

The best time for watering is the morning, before the setting in of the sea breeze, which is very irregular as to time; but after it has done so, there is often a nasty surf on the beach, which renders watering and even landing difficult.

Elephant bay.—This bay, which lies SW. about 5 miles from Equimina bay, is 2½ miles across between its entrance points, and from this line the bay falls back 1½ miles to the southward. It is one of the best anchorages on this part of the coast, being perfectly secure and sheltered from the only winds that blow, the south and SW. Making Elephant bay from the north, the sugar estate at Equimina is easily recognized, and on getting nearer the Friar rocks open out; and its position may also be known by a table-land 1,100 feet high near the bottom of the bay, which may be seen from a great distance to seaward.

Though the water in the bay is deep, it shoals gradually toward the beach, close to which there are only a few places with less than 4 fathoms; and the best anchorage is in 10 fathoms, about 600 yards from the beach at the SW. angle of the bay. The water in the bay is perfectly smooth, and the place is completely beyond the influence of the rollers, which occasionally set in along the whole coast. Fish, consisting of mullet, bream, rock cod, and many other kinds, can be procured with the seine in great

abundance. Excellent oysters can be gathered from the rocks on either side of the bay.

This is by far the best place on the south coast for refreshing a ship's company after a cruise, for the climate is very salubrious, as is indeed the whole coast to the southward of Salinas point. Here the crew may enjoy a run on shore, wash their clothes, bathe, or haul the seine; the two latter must be done with caution, as sharks are often seen in the bay. Beef and vegetables in plenty are obtained from Equimina, 5 miles distant, the former being moderate in price.

Water can not be procured in Elephant bay, excepting during the rainy season, which sometimes does not occur once in five years. No rain whatever fell during the years 1840, 1841, 1842; but it is said that when rains do set in they continue incessantly for weeks together, and the country then becomes almost inundated. The appearance of a large number of water courses seems to corroborate this statement.

Friar rocks.—These rocks, three in number and about 14 feet high, are steep-to and lie about 400 yards from Friar point, the western point of Elephant bay. Friar point may be rounded about 600 yards off, but not nearer, on account of a rocky spit which extends about 200 yards off the point in a northerly direction.

The longitude of Friar rocks, Elephant bay, as determined by measurement from Mossamedes, is 12° 42′ 39″ E., or 0° 6′ 21″ west of that hitherto adopted. The coast line in the vicinity may therefore be considered to be this distance in error.

Tides.—It is high water, full and change, in Elephant bay at 3h. 10m.; rise of tide 5 feet. The current generally sets to the NNW., but occasionally it turns to the eastward, in which direction it has been known to run at the rate of 1½ knots; it does not appear, as in other localities, ever to change its direction to the southward.

Cape St. Mary.—This cape, on which is a small pillar (erected by Diogo Cam, the Portuguese navigator, in 1486), visible only when close in and to the northward of it, is about 17 miles SW. of Friar rocks, the intervening coast being indented and but little known. The cape itself is of moderate elevation; when brought to bear N. 65° E. (N. 85° E. mag.), there will be seen a high distant mountain of a rounded form, and apparently isolated, on the same line of bearing.

St. Mary bay.—This bay lies immediately eastward of the cape, whence the bay is 1½ miles broad in an ENE. direction, and nearly one mile deep. This space is greatly reduced by Bay island, a white triangular-shaped islet occupying the center of the bay. Small vessels might sail round the island, but between it and a rocky point which divides into two parts the sandy beach at the depth of the bay there is a submarine causeway with

less than 2 fathoms water on its shallowest part, though elsewhere around the islet it is steep-to.

The anchorage is perfectly safe and well sheltered, but in consequence of its limited extent it is only adapted for vessels of small size; and even they should only attempt to enter with a fair wind, for if caught in a calm the swell will endanger their being driven on shore, without the possibility of anchoring in consequence of the great depth of water. The best anchorage is in about 24 fathoms, sand and decayed coral, midway between the islet and the western shore of the bay.

Captain Owen in H. M. S. *Barracouta* rounded cape St. Mary within 100 yards of the rocks; on the western side of the cape were three coves, or bays, capable of affording excellent anchorage. The mountains from this cape northward to Elephant bay are of granite, interspersed with mica and quartz; one of the cliffs abounding in the former reflected the sun's rays to a considerable distance, like a vast mirror.

Pine islet is a large black rock about 115 feet high 3 miles southwestward from cape St. Mary and about one mile from the coast. Between the islet and the shore there are some rocks, but the passage has not been examined.

The coast between capes St. Mary and Sta. Martha is formed of granite cliffs, falling in most places steeply to the sea, especially between Espiègle and Mary bays, and interspersed with valleys, which terminate in a broad white sandy beach. The summits of the cliffs possess no characteristic forms, being mostly rounded off and covered with sparse vegetation.

Cape Sta. Martha.—This cape of moderate elevation, and forming a salient feature of the coast, lies SSW. 30 miles from cape St. Mary. At cape Sta. Martha is the termination of the high cliffy nature of the coast, and the shore presents a succession of small sandy beaches separated by low cliffy points. Eastward of the cape is the bay of Sta. Martha, a large indentation, the shores of which are unusually steep-to, which is also characteristic of the whole coast between capes St. Mary and Sta. Martha, and with the exception of Espiègle cove, no anchorage ground can be obtained.

Espiègle cove is an indentation on the south side of Sta. Martha bay, with anchorage in 11 fathoms. The cove is the eastern of two small bights, and must not be confounded with the western one, which runs in about a mile in a westerly direction, and appropriately named Bottomless pit. Espiègle cove is indented in a southerly direction, with a beach at its head; the shore generally consisting of high cliffs, with some small beaches between.

Das Matilhas bay.—About 6 miles southward of cape Sta. Martha is the north point of Das Matilhas bay, open to the westward and 4 miles across between its points, off each of which is a bank which breaks. The north

point has a reddish tinge, and in the bottom of the bay the Inamangando river joins the sea; but the place affords no shelter.

Tiger bay.—This indentation lies in latitude 14° 10′ S., about 9 miles southward of Das Matilhas bay, and is perfectly sheltered from the prevailing SW. winds and swell, but its position is difficult to recognize on account of its SW. point being very low, and therefore not easily made out from seaward. The latitude is the best guide, though two conical hills which rise from irregular ground surrounding the bay, backed by high mountains, will assist in identifying the place.

The SW. point of the bay should be rounded a mile off, in order to clear a shoal bank which extends some distance in a northerly direction, and then steering in to the SE., anchor in 6 or 7 fathoms; or anchorage may be had in from 8 to 10 fathoms, with the two conical hills N. 68° E. (N. 89° E. mag.), and N. 79° E. (S. 80° E. mag.). In the bay the winds are regular and the sea breeze sets in about 10 a. m. from the WSW., and veers round to the south about sunset, after which calms generally prevail.

This anchorage offers no resources, as the plain which surrounds the bay is without vegetation or water. There are, however, deer, hares, and partridges, but great caution is necessary in pursuit of game, as the country is frequented by elephants and tigers; hence the name of the bay. Game is scarce now.

Do Velho bay lies 9 miles southward of Tiger bay, and has a sandy shore between its two sharp rocky points; but the bay is exposed and affords no shelter. In the northern depth of the bay is the San Nicolas river, with a reef having but 10 feet water extending 1½ miles off its south point; southward of this stream is the village of Chapen Armada, which consists of five or six white houses close together, with detached houses on either side.

A sugar plantation and rum distillery, employing 200 natives, is established here, from which rum, sugar, and also dried fish are exported in coasting vessels. The river at present (1877) has no outlet, there having been no rain for 5 years.

Temporary anchorage may be obtained abreast of the factory in 5 or 6 fathoms.

Mount Do Velho, or Old Man hill, 750 feet high, stands on the south side of the bay, and from its remarkable truncated form is an admirable mark for making Tiger bay from the southward; it is of a darker color than the coast, and from some positions it seems to be detached. Further inland to the SE. is a range of table hills extending nearly NNW. and SSE. for a distance of 12 miles.

Rocks.—About 7 miles from the south point of Do Velho bay is a group of rocks close inshore, running parallel to the coast; the highest of these rocks is about 9 feet above the water.

Mount Redondo.—This hill of a rounded form 600 feet high, lies about 14 miles southward of mount Do Velho; it is 10 miles northward of Das Moscas bay and is often mistaken for Do Velho mount.

Das Moscas bay.—This bay lies 24 miles southward of mount Do Velho, and is a small indentation with a sandy beach, and a stream which dries during the dry season; the place affords no shelter.

Turtle bay.—The northern extremity of this bay is known as Gertrude point, and thence the bay is 7 miles across, with a sandy beach between, to its SW., which though not very salient, yet affords some protection from the swell. This bay is more easily recognized from the southward than from the northward; and in it anchorage may be had in from 10 to 13 fathoms, good holding ground. The shores are fertile and appear to be inhabited.

Das Pipas bay.—About 3 miles southward of Turtle bay is a small indentation, where good anchorage may be found in from 10 to 13 fathoms. This bay derives its name from the fact of the Portuguese authorities having caused a large number of casks intended for slave ships to be burnt here. A white house close to the beach is a useful mark for identifying the bay.

Giraul river.—From Das Pipas bay perpendicular cliffs continue southward to Giraul river, the entrance to which is fully open when bearing about S. 62° E. (S. 40° E. mag.), and is easily recognized.

Little Fish bay.—The boundaries of this large indentation are cape Euspa, to the northward, and Annunciation point, which bears from the cape S. 29° W. (S. 51° W. mag.), 7 miles; and from the line between these points the bay falls back to the eastward 6 miles. The bay is known to the Portuguese as Mossamedes bay, after the governor of Angola, who in 1715 fitted out an expedition, resulting in the discovery of this bay. In order to commemorate the event, the name of Mossamedes was conferred on a colony established here in 1840, and also extended to the bay.

Cape Euspa is low, and dark colored, with a few prickly pear bushes on it, but without any remarkable feature, and from it the coast trends south about 4 miles to ponta do Giraul, a rounded rocky point, of moderate elevation, and steep-to. From the point the shore takes a rounded form to the eastward for about a mile, where the sandy beach commences, and thence continues along the east shore of the bay to Negra point, a bluff rocky promontory in the southern part of the bay, on which stands a church with two towers and the fort of San Fernando, and near it to the westward the Governor's residence, a large, conspicuous, square one-story building, with central tower.

In the depth of the bay is the mouth of the Béro river, southward of which the 3-fathom line extends $\frac{2}{3}$ mile off shore; to the southward of the river are the gardens and a chalybeate spring.

Westward of Negra point the coast forms a small sandy bay, bounded on its western side by ponta do Noronha, a perpendicular bluff 125 feet high, distant 3 miles southward of ponta do Giraul, and the line between these points is the boundary of the inner portion of Little Fish bay, which thence falls back to the eastward 2 miles. On the summit of ponta do Noronha is a white lookout house and flagstaff; the best anchorage will be found off the small bay between it and Negra point. The white house is a good landmark and visible from a distance of 12 or 15 miles.

From ponta do Noronha the shore continues cliffy for one mile in a SW. direction to Wrangler point, when it becomes low and sandy, to Shoal point, ¾ mile westward, and terminating in Annunciation point, 6 miles westward of ponta do Noronha, and which being also low and sandy is difficult to make out.

Longitude.—Ponta do Noronha flagstaff is situated in latitude 15° 11′ 09″ S., longitude 12° 07′ 34″ E.

Amelia shoal derives its name from a Portuguese war schooner lost on it in 1846. The dangerous shoal consists of sand, stones, and rock, with several depths of from ¼ to 4½ fathoms; a patch of 2 feet, which breaks at intervals, lies 800 yards within the northern extreme. The shoal extends 1¾ miles northward from Shoal point, at which point it drops suddenly into deep water.

Fort San Fernando open of ponta do Noronha bearing S. 65° E. (S. 42° E. mag.), leads northward of Amelia shoal.

Mossamedes.—The new town of Mossamedes, the most southern of the Portuguese settlements on the coast, borders the sandy shore within Negra point. The houses are regular and the streets wide. The customhouse is a rather handsome building; north of it is a two-storied house and a flagstaff; west of San Fernando fort is a large square building, the new residence of the governor, and also a church with two towers. A flagged roadway is made over the high beach, leading to the gardens and plantations of Béro river. The population of the new town was about 300 in 1881. Many establishments in the country are owned by colonists from Brazil, who farm the land, which produces abundantly. Cotton of a good quality is cultivated, and sugar and coffee are also among the products, besides which a considerable quantity of fish is cured for exportation.

A smallpox hospital is situated ¼ mile eastward of ponta do Noronha.

A large number of natives are established in and around the bay, many of whom are intelligent; but there are also some natives of port Alexander country, a miserable looking race; they have no huts, but shelter themselves from the wind by a few palm leaf screens, than which they seek no better protection, as rain seldom falls.

Climate.—The climate is cool and bracing from about June to Septem-

ber, the temperature often being as low as 42°; the maximum of the opposite season is 86°.

Pier.—An iron pier with foundations of masonry extends for 164 feet from the shore to a depth of 15 feet at high water springs, with a line of rails connecting it with the customhouse.

Lights.—A fixed white light is shown from a lighthouse 10 feet high on ponta do Giraul, at an elevation of 66 feet above high water and should be visible from 10 to 12 miles. Also two lights are exhibited from the extremity of the pier about 20 feet above high water; the northern light is red, the southern green, each visible about 3 miles.

Tides.—It is high water, full and change, in Little Fish bay at 2h. 30m.; rise of tide 6 feet, approximate.

Supplies.—Bullocks are good and cheap, averaging from 14 to 16 dollars each; they are used for riding by the colonists, and are equipped with saddles and bridles for that purpose. Sheep, pigs, and fowls may also be procured; and fish in any quantity may be caught with the seine, the best time being early in the morning.

Cabbages, pumpkins, potatoes, and other vegetables, as well as oranges, melons, and citrons are, as a rule, abundant though dear; but there are exceptional seasons. Orchilla, ivory, and wax are the principal exports from this place.

Water is obtained from the mouth of the Béro river, which is 1½ miles from the usual place of anchorage; and is procured by anchoring the boat about 150 yards to the northward of the river, and hauling in to about 60 yards from the fresh water, and filling with force pump and long hose.

The best time for watering is before the sea breeze sets in; but during the rollers the water becomes brackish. Steamers would complete more rapidly by anchoring off the entrance; but it is not safe to do so in a sailing vessel, as the rollers may set in.

The water in wells is brackish and not fit for drinking. The Béro stream must not be depended upon for a supply of water during the dry season, as sometimes there may be one foot of water in it, but at other times it may be dry.

Coal—A hulk belonging to the telegraph company is moored in the anchorage. She holds 700 tons of coal. Permission from London must be obtained to procure it.

Buoys—Two small red buoys are moored off the telegraph house, about 100 yards apart, to mark the cable.

Soundings.—The *Talisman* anchored a little outside of the alignment of Noronha and Negra points, and several lines of soundings were run from the anchorage to the latter point and to the right and left of it. Somewhat lesser depths were found than shown on the charts, caused by

the alluvial deposits of the Béro river. The bottom is muddy sand and the holding ground is good all over the bay.

Anchorage.—The anchorage in Little Fish bay is safe, being sheltered from all winds, excepting those from the north to NW.; it is easy of approach, as the sea breeze blows across the bay, thus making a leading wind in and out. The northern side of the bay is very deep, there being as much as 284 fathoms ½ mile to the southeastward of ponta do Giraul, thence shallowing to 13 fathoms within 200 yards of the point. In the southern part of the bay, however, there is a moderate depth of water, and good anchorage may be had in the small bay between ponta do Noronha and Negra point, in from 5 to 7 fathoms, about equidistant from the look-out house and fort San Fernando, with the latter bearing S. 51° E. (28° E. mag.). Vessels must not anchor east of the line of bearing, ponta do Giraul light N. 40° (N. 17° W. mag.), on account of the telegraph cable.

A heavy sea usually breaks on ponta do Giraul, making it dangerous to attempt passing too close under sail only, as the water is too deep to admit of anchoring, and the wind does not blow home. At the back of Little Fish bay, there are some high ranges of hills which show very white from the offing when the sun is on them; and when their outline is once known, they become excellent marks of recognition.

Annunciation point, the southern point of Little Fish bay, is low and sandy, and off which a spit extends, breaking heavily at times, at the distance of 600 yards from the point.

Cape Negro.—Near Annunciation point, hills and high cliffs commence along the coast, which extends SSW. about 28 miles to cape Negro. Northward of the cape the land falls back into the large open bay of cape Negro, presenting several rocky points. In a gorge between two of these points, marked by some trees, is the bed of the river dos Flamengoes, whose mouth is completely barred with sand during the dry season, and on whose northern bank, a few miles inland, is the village of Lonchaut. At 2¼ miles to the southward of Flamengoes river is Coroca river.

Cape Negro is a remarkable headland, formed by a precipitous mass upwards of 200 feet high, rising at the extremity of a low point, and resembling an island. It makes with a round, rugged, black face, whence the name, and is encrusted by different colored earths and sands abounding in fossil shells of various species, the most remarkable being of a spiral form. On the summit of the cape stands the pillar or remains of a marble cross erected by Diego Cam, the Portuguese navigator, in 1486.

Bank.—A bank is reported, with depths of from 4 to 6 fathoms, as extending for one mile off cape Negro and southward of that cape as far as Sandstone cliff, on the eastern shore of port Alexander.

Port Alexander.—About 6 miles to the SW. of cape Negro is Sandstone cliff 134 feet high, projecting from the interior like an immense

wall; and as it is visible from a distance of upwards of 20 miles, it forms a good mark for the port. This point forms the eastern extreme of port Alexander, whose entrance lies 9 miles SW. by S. of cape Negro. The port forms a commodious harbor, where vessels may lie in perfect safety at all seasons of the year.

The peninsula forming the west and north sides of the port is a low, steep, sandy tongue, terminating in Bateman point, whence the mouth of the port is $\frac{4}{5}$ mile across. From this line the harbor runs back in a westerly direction for a distance of $2\frac{1}{4}$ miles, the only danger being a bank of shoal water extending $\frac{1}{2}$ mile southward from the inner side of the spit, and narrowing the space for available anchorage to $\frac{6}{10}$ mile. This bank, however, can scarcely be deemed a danger, as its outline is always distinctly marked by discolored water.

Dormer bank.—This bank, whose inner boundaries are not well defined, is of some extent, with general depths of 5 and 8 fathoms, the least known water being 3 fathoms. From this spot Bateman point bears S. 27° W. (S. 50° W. mag.) $1\frac{1}{2}$ miles, and the northern tangent of Sandstone cliff N. 86° E. (S. 71° E. mag).

Supplies.—A few natives are occasionally seen in this locality, but they are miserable in appearance and very shy; a little kindness, however, has been known to acquire their confidence, and induce them to supply bullocks and sheep at a very moderate price. Plenty of fish may be caught with the seine; and good fresh water may be obtained on the south side of the port by digging a few feet below the surface of the sand.

Tides.—It is high water, full and change, at port Alexander at 3h.; tide rises 5 feet.

Directions.—When approaching port Alexander from the northward it is easily recognized by Sandstone cliff, but the approach from seaward or from the south will be attended with some uncertainty as the sandy peninsula will be confounded with the mainland, and a mist is of frequent occurrence. A good lookout, however, from the masthead will be able to see the port over the sandy neck; but on nearing the entrance avoid bringing Bateman point to the westward of south (S. 23° W. mag.) until within one mile of it, or Sandstone cliff bears N. 77° E. (S. 80° E. mag.). Dormer bank will then have been past, and an anchorage may be selected where most convenient. A good anchorage is opposite the easternmost fisherman's hut in 13 fathoms water at about $\frac{1}{4}$ mile from the shore.

False bay.—This bay lies a mile W. by S. from the inner depth of port Alexander, for which it has often been mistaken; it is said to afford good snug anchorage by rounding a point resembling Bateman point, in about 10 fathoms, and anchoring when under its shelter. Great caution, however, is necessary, as the place has not been surveyed, and H. M. brig *Harlequin*, on leaving False bay, passed over a shoal with 7 fathoms on

its outer edge; when judging by the sudden change which took place in the soundings, it was supposed that less water existed.

Albino point.—From port Alexander the sandy coast trends west for 3 miles, then SW. for 3 miles, thence falling back to the southward forms a bay, whose southern termination is Albino point, formed of steep white cliffs, of moderate elevation, with white needle-shaped rocks, which, with the rays of the setting sun upon them, resemble a mass of ruined marble columns. The shore is inaccessible, and the sea always in a state of disturbance, occasioned by the currents which run past the point in a violent and irregular manner. At the distance of 2 miles off shore there are depths of 30 fathoms.

Caution.—Albino point is very low and dangerous and extends more to the SW. than charted. Great caution is necessary when approaching it at night or in thick weather. The low sandy beach from the point round to the north has also extended. Near sunset at a distance of 2 miles, the white needle-shaped rocks could not be made out. From port Alexander round to Albino point the shore is nothing but low sandy beach with heavy breakers. Commander Baird, H.M.S. *Raleigh*, 1893.

Great Fish bay.—From Albino point, the coast trends south about 57 miles to the bottom of Great Fish bay; but from the above point to Tiger point the northern extremity of the long sandy peninsula forming the west side of the bay, the distance is 37 miles, thus making the bay about 20 miles in length, the breadth at the entrance opposite Tiger point being about 5 miles.

The land about Great Fish bay presents a succession of high sand hills without a vestige of vegetation; while the low sandy tract of land known as Tiger peninsula is only a few feet above the sea, and, with a fresh wind, is frequently inundated. In no place does the spit exceed 3 miles in breadth, while at the head of the bay, where the land is low and marshy, the isthmus, by which it is connected with the mainland, is only $\frac{1}{3}$ mile broad and frequently washed by the sea.

The vicinity of Great Fish bay is difficult of recognition, on account of the lowness of land and thick haze which prevails almost continuously along this sandy coast; the distance off shore, however, may be easily determined by the soundings, which are very regular. Tiger point may be rounded close-to, and anchorage may be obtained in any part of the bay.

Banks.—From the eastern side of Tiger peninsula, between the distance of $3\frac{1}{2}$ and 7 miles from its northern extreme, a bank extends from $\frac{3}{4}$ mile to $1\frac{1}{2}$ miles off. The bank is steep-to, and its southern portion, which is nearly awash at low water, is known as Griffon bank. Caution must be used when approaching this part of the peninsula for anchorage.

There is also another bank with only one foot water on it, situated about S. 58° E. (S. 34° E. mag.) 14 miles from Tiger point, and about $2\frac{1}{2}$ miles

off the beach on the eastern side of the bay; other patches exist between this and the shore. This is only approximate, as the exact position of the banks have not been determined. Abundance of driftwood may be obtained from Tiger peninsula, and any quantity of fish may be caught with the seine, but no other supplies of any description.

Tides.—It is high water, full and change, at 2h. 30m.; tide rises 5 or 6 feet.

Caution.—There is reason to suppose that Great Fish bay has undergone great changes since its examination by Capt. Owen in 1825, and it is also possible that many shoal spots may have escaped observation; it is therefore necessary to navigate the bay with caution.

Soundings.—From Benguela bay to port Alexander, a distance of about 200 miles, the bank of soundings is narrow, and great depths are found close to the shore, thus rendering anchorage almost impossible, excepting in a few sheltered bays. In all cases, especially during calms, it is advisable to keep a good offing, in consequence of the swell, which sets a vessel in shore of her supposed position, besides which, ships running alongshore will often be supposed to be farther off the land than they really are, on account of the light sandy nature of the coast and the extreme haziness of the atmosphere that generally prevails.

Between port Alexander and Great Fish bay the depths vary from 7 to 11 fathoms about 2 miles from the coast, increasing to 44 fathoms 8 miles off shore; the general nature of the bottom being sand or sandy mud.

General remarks.—Perhaps in no quarter of the world is the weather so fine as upon this coast, for south of Benguela rain seldom falls, though heavy dews prevail at times. The prevailing winds are from south and SW. all the year round, with variations to SE., as land winds, when in shore. At the distance of 80 or 100 miles off shore, the SW. winds become more regular; they generally veer round to the southward and eastward, and imperceptibly unite with the SE. trade wind.

These SW. winds are frequently very fresh, creating a heavy sea, and the resulting swell breaks on the shore with much violence, rendering landing frequently impossible, and always difficult, excepting in bays sheltered from wind and swell.

The passage along the coasts of Angola and Benguela from the southward may be made with great facility, as both wind and current are generally favorable; but when proceeding to the southward it will be found sometimes very difficult to make satisfactory progress when in the vicinity of Palmeirinhas point, as the current generally sets to the northward with considerable force.

On such occasions it is advisable to make a long stretch off the land to the distance of 50 or 60 miles, which will enable a vessel to weather the point on the port tack; it seldom answers to work to the southward along-

shore. Along the rest of the coast the tacks should be arranged so as to be able to stand in shore the moment the sea breeze falls, and thus take advantage of the land wind during the night. Nevertheless, vessels should avoid being becalmed in shore to the southward of cape Sta. Martha, for, as previously remarked, even in case of necessity, there is no anchorage.

Vessels should not effect a greater offing than 50 or 60 miles, as beyond these limits the sea breeze declines in force and draws more to the southward, which would necessarily cause a loss of ground on the in shore tack, besides which they would lose the advantage of the alternate land and sea breezes, which are almost invariably experienced closer in shore.

The following remarks relating to the southern division of the African coast, between the Nazareth river and Little Fish bay, are by Capt. Thomas Miller, R. N., in 1855:

Seasons.—From May to November may be considered the fine season; during this period, particularly from the middle of June until early in October, beautiful bracing weather is experienced, though at times heavy dews fall, particularly in July. When the dews are very heavy, the land and sea breezes are invariably light, sometimes very much so, and consequently a passage along the coast then becomes tedious. The direction of the sea breeze is not to be depended on, as it may blow one day from SSW. or SSE. and the next from west or WNW.

The hot season commences in November and lasts till the end of April. This may be considered the sickly and rainy season; most rain falling during February and March; but south of St. Philips bonnet, Benguela, rain rarely falls, and frequently a season passes without any hazy weather like the smokes in the bight of Benin. The sea breeze is uncertain at all times, coming one day early before noon and another late in the afternoon. But the earlier it sets in the longer it will last, though frequently, when setting in late, it makes amends by blowing very fresh, and it may happen at times that the late sea breeze may last till 11 p. m., whereas, generally, it seldom blows after sunset.

We invariably found that the earlier the land breeze came off, the fresher it blew, and if it came before 4 a. m. a vessel might reckon on making good progress. Sometimes it does not come until 7 or 8 a. m., when it rarely lasts, is generally light, and sometimes merges into the sea breeze, the latter drawing gradually round as it freshens. During the prevalence of thick weather and dews, the land breeze is lighter than at other times, and with the latter it is frequently little more than the cold air arising from the land as the sun descends, but extending a very short distance from the shore.

CHAPTER XVII.

GREAT FISH BAY TO POSSESSION ISLAND.

Remarks.—The coast between Great Fish bay and the English colony of the cape of Good Hope is inhabited by various tribes, the principal being the Cimbebas, who inhabit the countries of Cimbebasia, between Great Fish bay and cape Cross, and the Hottentots, who occupy Hottentotia, between cape Cross and the Orange river. From Tiger point the land trends S. by E. about 21 miles to the isthmus, and thence the general trend is about south as far as cape Frio, a distance of 96 miles. The whole of this coast, from about cape Negro to beyond Ichabo island, is a desert of sand, without rain, though at times heavy dews prevail. The value of the guano deposits is owing to the extreme dryness, as it would be entirely destroyed by the influence of rain. Good guano has only been found in three similarly situated localities, viz, on the west coast of Africa, the west coast of South America, and the west coast of Australia, all within the same latitudes, and subject to the same climatological influences.

The natives along this coast are singular in appearance and peculiar in character. They are very sparsely distributed, and, though generally harmless, are of little service to civilized men. Game is very abundant.

The coast is but little frequented, and less is known of it than of the the other parts of the same continent, there being but little to attract vessels.

Winds.—The winds between capes Negro and Frio generally prevail from the SW., are often very strong and create a heavy sea. Heavy squalls and gales of wind are frequent, and often come on without warning, and with a cloudless sky. Sometimes sand is blown from the desert in large quantities, filling the air with minute particles, which are a long time subsiding and accompanied by intense heat. The ordinary state of the atmosphere along this coast causes refraction, and fogs are also frequent.

Current.—The South African current is constantly setting north or NNW., and following the direction of the coast at the rate of one mile an hour; and as the general direction of the wind is SSW., it is necessary for vessels proceeding to any part of the coast to make the land to the southward of their destination, as it is very difficult to work against the current when in shore.

There is, however, no great difficulty in proceeding along this coast to the southward, if due advantage be taken of the variations of the wind,

and the tacks arranged accordingly. As a rule the wind after noon hauls round to the SW., when, with a good offing, a vessel might make southing on the in shore tack until night, when the wind generally backs round to the southward, and a good board to seaward will place a vessel in a position to take advantage of the southwesterly breeze the following day.

Caution.—As the rollers frequently set in along this coast from the westward with great violence, and there is almost always a heavy swell upon the shores, it is advisable to give the shore a good berth, except in making the harbors. This remarkable swell, which incessantly prevails from the SW., renders it very unpleasant for ships in calms, which often prevail during the night.

Breakers.—The 5-fathom danger marked on the chart in latitude 17° 49′ S., at about 2 miles off the coast, has probably less water on it. A light surf was repeatedly noticed breaking upon it when passing, it being calm at the time with a swell from WSW.

Between latitude 17° 45′ S., and Khomel river, at the distance of 4 miles from the shore, the color of the water frequently changed suddenly from a dark bluish green to a bright green, indicating that there may be shoal patches.

Nourse, or Cunene, river.—From the isthmus at the south end of Tiger peninsula to the entrance of the Nourse river, a distance of 25 miles, the coast to the southward consists entirely of sand, crowned with dark-tinted downs, which are visible from seaward from 15 or 16 miles. The Nourse river only reaches the sea during the rainy season, as during the dry season its entrance is effectually barred by a bank of sand, on which the sea breaks furiously, especially on its south point, whence a reef extends several miles to the westward.*

Capt. Owen, who sought in vain for the outlet of the stream, remarks: "On November 28, 1826, we arrived in Great Fish bay. We had in vain looked for Nourse river, but we could perceive no opening whatever. Mr. Newman, the master of the *Espiègle*, gives directions for boats to cross the bar and take fresh water; consequently, there can be no doubt that the river did exist; but, upon our arrival, we found not a trace of it visible, neither was there any opening in the land for 30 miles on either side. It is inferred that the rainy season commences with the new year, when the waters force this passage or river in their course from the interior, and consequently Nourse river is open at that season; but that during the dry season it is again closed by sand, thrown up by the surf and strong perennial winds."

Boundary.—The Nourse, or Cunene, river, is the boundary between the German and Portuguese territory.

* As the chart does not show any reef off this point, it is possible that it may not extend several miles to the westward.

Shoals.—The shore to the northward and southward of Nourse river is safe, with the exception of a small shoal patch in latitude 17° 42′ S., and another in 17° 50′ S., both of which extend about ½ mile from the shore.

Clan Alpine shoal.—A shoal lies with cape Frio, bearing S. 32° E. (S. 8° E. mag.), approximately, distant about 26 miles.

This shoal, on which the British steamer *Clan Alpine*, drawing about 21½ feet, is stated to have struck in January, 1890, is reported to be from 3 to 5 miles from the shore, and presents a danger to shipping. Position, to be considered very doubtful.

Cape Frio.—The shore of this cape, which is in latitude 18° 23′ S., longitude 12° 03′ E., is sandy and low, and so continues for a distance of 45 miles to the southward, with a shore generally clean, and depths varying from 13 to 18 fathoms a short distance off shore. To the northward of the cape, the land is high for a distance of 18 or 21 miles, and a few miles to the northward of the cape is Angra Frio, or Frio cove, where the shore is low and steep, and may be known by three hills, the central one being the highest.

The coast between cape Frio and Walfisch bay, a distance of 280 miles, was examined by H. M. S. *Swallow* in 1879, for the purpose of landing an expedition, but which failed, owing to the impossibility of landing the stores anywhere between these points. The stores were eventually landed at Walfisch bay.

False cape Frio.—In about latitude 18° 27′ S. a point projects from the otherwise uniform land, and between it and cape Frio the shore forms a bay with a semicircular sweep, about 5 miles round. Under the point which has been named False cape Frio, H. M. S. *Swallow* in 1879 anchored in 8 fathoms, sand and mud, with the cape bearing S. 16° E. (S. 8° W. mag.), distant about 1¼ miles. Vessels should use this anchorage with caution, and not bring the cape more westerly than S. 13° E. (S. 11° W. mag.).

Between False cape Frio and Fort Rock point a line of soundings was carried at 1½ to 2 miles from the shore, the depths thus obtained being 9 to 12 fathoms; 8 to 10 fathoms are found close in shore till within a distance of 4 miles from Fort Rock point, where foul ground with breakers extends west about a mile. The shore presents an unbroken line of surf, the flat sandy foreshore rising to hills of irregular outline, apparently of 300 to 600 feet elevation.

There is no landing between False cape Frio and Fort Rock point; no trace of water, nor of the country that came within sight being inhabited.

Fort Rock point is prominent, and can not be mistaken; it is a low sandy point with a large rounded block of granite close to it, which is conspicuous for its whiteness, apparently caused by guano. The *Swallow* approached the breakers on the northern side of the point, and carefully searched for the anchorage which is said to exist there, but without success; the vessel

then anchored in 8 fathoms, with the point bearing S. 63° E. (S. 39° E. mag.), distant one mile.

On three occasions boats were sent to search for the cove said to be situated to the northward of the point, and to effect a landing if possible, but after every exertion being used, they returned unsuccessful; and it is considered that there is no safe landing place at Fort Rock point.

It being the dry season—month of October—no trace of the river reported to be situated 6 miles south of the point could be seen; neither could the barrier reported in latitude 19° 19′ S. as extending 200 yards from the shore be seen.

The coast from Fort rock to cape Cross is apparently free from dangers, as, with exceptions to be presently mentioned, soundings of not less than 10 fathoms were found within a mile of the shore. Flat rocky surf-beaten coast, with sand hills of moderate elevation extending as far as the eye can reach, continues mile after mile, varied occasionally by signs of vegetation in the form of the Naras plant—a fruit-bearing creeper said to be a sign of the presence of fresh-water moisture.

Swallow breakers.—In the course of the examination of this coast the *Swallow* found shoal ground extending in a westerly direction about 2 miles from the shore—the outer extremity of the shoal being in latitude 20° 5′ S., longitude 13° 6′ E.—and above which the sea was breaking. When in the vicinity of this shoal ground (now named Swallow breakers), great caution should be observed, as the lead gives little warning; and it is possible that after a continuance of fine weather the sea may not break.

In latitude 20° 14′ S., a perpendicular sand hill, about 500 yards long, was passed, in which were two openings having the appearance of periodical river beds, with a sand bank extending two-thirds across the mouth, inside of which was a considerable extent of rushes and reeds. No doubt this would offer a valuable highway to the interior could a landing be effected, but of this no prospect was visible.

Further south two remarkable rocky mountains may be seen inland—the Sugarloaf to the northward, and the Cockscomb to the southward.

Palgrave point.—The *Swallow* anchored immediately north of a point (now named Palgrave point), from which a line of breakers extends to the NW. about ¾ mile. From the anchorage in 10 fathoms, sand and mud, the outer breaker bore S. 6° E. (S. 19° W. mag.). In this berth there is protection from the rollers, and with a SSW. wind it is considered safe, but a vessel should always be ready to put to sea on the approach of a SW. gale. There is no landing place.

Ogden harbor.—The position assigned to this harbor by Capt. Morrell, in the year 1832, was in latitude 20° 57′ S. Northward and southward of this position the coast was closely examined by the *Swallow;* but no

signs of any such harbor could be seen, neither was there the least appearance of the anchorage described by Capt. Morrell.

Mr. W. C. Palgrave, the special commissioner of the relief expedition on which the *Swallow* was engaged, remarks that it is not easy to account for the disappearance of Ogden harbor: "The foreshore of that part of the coast is moderately high rock, so that it can not have been silted up by drift sand, as might at first have been supposed, but there can be no doubt that it existed, and must either have been submerged or, what is more likely, washed away by the incessant action of the rollers. A color of probability is given to this idea by the existence in latitude 21° 10′ S. of some detached rocks (Ogden rocks) that may be, and probably are, all that remain of the missing harbor.

Ogden rocks (21° 10′ S., 13° 37′ E.), about a mile distant from the nearest part of the shore, are dangerous, and should be approached with great caution. The *Swallow* anchored for a short interval to the northward of these dangers while the locality was examined in a steam cutter. The rocks were breaking at the time mentioned.

Mount Dourissa.—To the northeastward of cape Cross, is the highest and most conspicuous peak of the whole mountain range, running parallel with the coast, and of which the Sugarloaf and Cockscomb are prominent points. This peak, which is known to the natives as mount Dourissa, is 3,200 feet above the sea, with a nearly perpendicular fall at its southern extremity, and abrupt faces to the east and west.

Cape Cross is a point projecting about a mile into the sea, in the form of a truncated pyramid, of moderate height, being the termination of, and connected by a low sandy plain to the chain of red sandstone hills, which extend into the interior in an easterly direction, and form a good mark from seaward. The cape is low and of a red color, difficult to distinguish, and from a distance appears as an island.

Off the cape, a reef about 100 yards long terminates abruptly in a depth of 10 fathoms. The sea breaks heavily on the cape, and there is no landing in the bay except after a continuance of the finest weather; the best place is abreast of a red sandstone rock. Towards the interior, the flat sand and rocky plains continue for some miles, rising into barren hills and mountains. From off the cape in fine weather mount Dourissa can be seen.

Landmarks.—On the hill abreast the red sandstone rock recommended for landing a post surmounted by a board with an inscription denoting the German protectorate has been erected. A similar post stands near the coast in about latitude 18° 02′ S. The wreck of an iron ship lies well upon the shore about 9 miles northward of the cape and may be seen for some distance. The hill, 660 feet high, in Sierra bay, is a good landmark for vessels from the southward.

Anchorage was found in cape Cross bay in 7 fathoms, fine sand, with the cape bearing S. 21° W. (S. 47° W. mag.). This anchorage, although fairly safe in moderate weather, is not a comfortable one, as the vessel lies broadside to the rollers. The best anchorage is stated to be 1¼ miles further northward.

From cape Cross to Walfisch bay the coast is clear, the lead giving sufficient warning when off Farilhao point, nor is there apparently any danger off the mouth of Swakop river.

The general results of the *Swallow's* examination of the coast between cape Frio—in the neighborhood of the southern limit of the Portuguese territory on the west coast—and the entrance of Walfisch bay may be stated thus:

The coast is apparently free from danger, with the few exceptions mentioned; there are no harbors; no places at which landing may be effected in ordinary weather; and no anchorages except those of a temporary character.

The whole of this coast was examined during daylight, and in many parts by means of boats.

Sierra bay lies between cape Cross, and the low and sandy Sierra point, a distance of 9 miles SE.; the bay runs back about 3 miles, but being exposed to westerly and southwesterly winds, as well as the almost constant swell, it is not a good anchorage, though it is sometimes frequented by whalers.

Farilhao point.—About 18 miles SE. of Sierra point is Farilhao point, dark and rocky, of moderate height, and surmounted by a sandy down. About ½ mile distant from the point, are two volcanic rocks, the Farilhaos, which tend toward its identification. About 3 miles north of Farilhao point is the mouth of Omaruru river, and at 2½ miles farther north, in latitude 22° 5′ 30″ S., the German gunboat *Habicht* noticed the bed of a dry river, probably an arm of the same. The gunboat failed to see the rocks off Farilhao point, and speaks of the point as a sandy spit with shallow water off it. When abreast of Farilhao point, there will be seen to the SE. mount Colquhoun, the highest peak of the Blue mountains; while to the eastward are two other very high and apparently isolated hills belonging to the same range.

Rock bay.—This bay is about 12 miles across, between Farilhao point and the southern point, which lies from the former about SSE. The bay affords no shelter, although it is sometimes frequented by whalers.

Mount Quanwas, or Colquhoun.—This remarkable mount, which lies in latitude 22° 30′ S., longitude 14° 51′ 30″ E., at the distance of 22 miles from the coast, is about 2,000 feet high, with several peaks which are sharp and inclined to the NE.; and near it is a large body of water forming a kind of lake, about 40 feet above the level of the sea. North-

ward of mount Colquhoun is a peculiar thumb-shaped mountain of about the same height.

Swakop, or Zwakaub, river.—The mouth of this river lies in latitude 22° 42′ S., and is marked by thick green foilage, with rocks on the south side. The river discharges into the sea almost regularly every year for one or two months in the summer; for the remaining ten months its course is dry (with the exception of a place just below Nxonidas, where there is running water all the year round) and its mouth is blocked by a sand bar. There are three small lagoons just within the bar, and the adjacent land is covered with reed and grass, affording pasturage for a few head of cattle; this is the only grazing spot, with the exception of the government reserve, about 8 miles up the river, near Nxonidas.

Boundary.—A German flagstaff and notice board stand near the northern bank of the river and English beacons near the southern bank. The boundary is midway between, in the bed of the river.

Caution reef extends ½ or ¾ mile off the point, which is almost 4 miles south of Swakop river entrance.

Walfisch bay.—Pelican point, the western point of Walfisch bay, lies SSE. 69 miles from cape Cross, the intervening coast which bends to the eastward is distinguished by white sand hills of moderate elevation, falling suddenly to the sea. It is entirely free from any known danger, and there are depths of from 4 to 6 fathoms at the distance of ¼ mile off shore. The bay is used for gun practice. Sharks are very numerous.

Walfisch bay in formation resembles most of the other harbors on this coast as far north as Loanda. Its western side is a sandy peninsula, nearly 4 miles in length, terminating at its northern end in Pelican point, where the breadth of the entrance is 3¾ miles. The bay is spacious and safe, being protected on all sides, excepting from the north and NW., whence winds are fortunately not of frequent occurrence. All the shore is of sand and the soundings regular, gradually decreasing from 8 to 3 fathoms; but within the peninsula, along the western shore of the bay, the water is shoal, and the coast at the bottom of the bay low and marshy.

Though from its position Walfisch bay affords an easy and speedy communication with the interior, it labors under the disadvantage of having no water near the beach.

Bird island, at the eastern side of entrance to Walfisch bay, is now awash at high water.

Remarks.—The whole of the territory, excepting the beds of the Swakop and Kuisup rivers, is an arid and sandy desert, with no appreciable rainfall and almost entirely devoid of vegetation. Rain only falls five or six days in the year, between November and April, and probably does not amount to one inch.

The entire district between Kuisup river and the sea (with the exception of a narrow strip along the coast) is covered with sand hills of considerable height, and these also extend along the coast as far as the Swakop, beyond which the sand is unable to pass owing to the Swakop annually scouring out its bed. The sand being blown from the desert toward the coast by the strong east winds which prevail inland, occasionally with great violence between the months of May to September, is met by the SW. wind prevailing on the coast. These combined forces have formed the sand hills about 300 feet high and gradually extended them toward the north, pushing the Kuisup from port D'Ilheo to its present point of discharge.

Kuisup river.—The water of this river reaches the sea always, but as for the last 60 miles of its course it has 30 feet and upwards of sand in its bed, it is only in years of exceptional rainfall in the interior that it saturates the whole of this sand and becomes a running river at its surface. The bed of the river in places exceeds one mile in width, but it forms a new course each time it runs.

Pelican point.—The general height of this spit above high water is 4 to 8 feet, but in some other parts it is only awash at high water. A hut that has been used for curing fish is situated ⅜ mile to southward of Pelican point, on the eastern side of the spit, but is scarcely visible from seaward, its roof being only 3 or 4 feet above the surrounding sand. The point is extending to the eastward and the soundings decreasing off Pelican point; it is necessary to use caution when rounding it, especially at night.

Beacon.—The former beacon on the point has been replaced by a conspicious beacon, pyramidal in shape, painted with alternate horizontal bands of red and white, and surmounted by a ball 10 feet in diameter painted white. The total height of the beacon is 41 feet above the sea level.

Anchorage.—The *Danae* steered in with the factory bearing S. 27° E. (south mag.), and anchored as soon as less than 5 fathoms was obtained. The factory is of the same color as the surrounding land, situated about 60 yards above high water mark on the SE. side of the bay, and was seen from seaward by the *Danae* at a distance of 6 miles.

H. M. S. *Sylvia*, 1880, anchored in the bay in 4 fathoms water, with the fish house, or Pelican point, bearing N. 55° W. (N. 28° W. mag.), and the factory on south side of bay bearing S. 27° E. (south mag.); but it is advisable, bearing in mind the silting up of the bay, to anchor farther out.

It is recommended for small vessels which intend remaining for some days to anchor with the church bearing about S. 72° E. (S. 45° E. mag.), so that the distance of more than a mile from the land may be made by the boats under sail when the fresh SW. winds are blowing. From noon and during the afternoon the SW. winds will at all times freshen up so as to cause a troublesome sea for boats and raise clouds of dust. Fogs are frequent in the evening.

Settlement.—The settlement in the bay consists of government buildings, mission, church, and outbuildings and five wooden houses or factories. Being but little above the sea level, some of these are nearly surrounded by water during spring tides. There is a resident magistrate here and a township has been marked out.

Supplies.—Fresh beef was obtained by giving a few days' notice. Mullet were caught near the beach north of the factory. A schooner comes up from the cape of Good Hope every two months with supplies and articles of trade. The water used at the settlement is obtained at Sanafontein. Here for a period of six months after the Kuisup has run dry water may be found embanked in the sand downs, but after that it is obtained by digging a foot or two, the chief deposit being in a backwash of the river. The water is put in casks and rolled to the settlement.

Occasional light.—Should a vessel be seen approaching Walfisch bay, and apparently unable to enter before dark, a light will be shown from near the factory on the south shore of the bay.

The light is a fixed white light, visible seaward from the bearing S. 73° E. (S. 46° E. mag.) to S. 17° W. (S. 44° W. mag.). It is elevated 25 feet above the sea, and should be seen, in clear weather, from a distance of about 8 miles. The light is unreliable.

NOTE.—Entering the bay, this light should be kept between the bearings of S. 25° E. (S. 2° W. mag.) and S. 14° E. (S. 13° W. mag.).

Tides.—It is high water, full and change, at Walfisch bay at 1h. 54m.; springs rise 6 feet.

Port D'Ilheo, or Sandwich harbor, lies about 27 miles S. by E. of Pelican point, the intervening coast being low and sandy, with a slight convexity to the westward. The port is formed by a low sandy peninsula on its western side, terminating in D'Ilheo point, nearly level with the sea, and having shoal water extending more than a mile off on its seaboard side, which is reported to be extending to the northward. The highest point of this peninsula is on the western side, where it is 16 feet above the sea.

About a mile to the southward of D'Ilheo point sand spits run out to the eastward from the peninsula, and to the westward from the mainland, leaving only a passage ¼ mile broad, with 6 feet of water, into an extensive lagoon, in which the depth of water increases to as much as 3 fathoms in some places. The lagoon has not been well examined, but appears to be about 4 miles long by 3 miles broad; and on its eastern shore, 2 miles SE. of the narrow entrance, is the watering place.

The harbor is difficult to make out in consequence of its sea face being a long, low, sandy spit, having the harbor and lagoon between it and the mainland, which is formed of high sand hills. In coming from the southward, and sure of the vessel's position, stand into 12 fathoms water at the distance of 2 miles off shore, and run along the land. The termination of

the breakers at the north extremity of the spit will soon be perceived, and the lagoon over the spit may be seen from the masthead.

The lagoon at the head of port D'Ilhoe abounds in fish, and a fishing party of Europeans is generally established there. There are also a few Hottentots, who give their services to the party in return for food.

Water.—This is the only place along this coast where fresh water can be obtained; it is found inside the lagoon about 2 miles SE. of the entrance, not 20 yards from the beach, its presence being indicated by some reeds, and by digging a trench 3 or 5 feet deep, good water may be obtained in abundance.

Tides.—It is high water, full and change, at port D'Ilheo at 3h.; rise of tide, 8 to 10 feet.

Caution.—Information has been received that a sand bank, with 5 feet water on it, has formed across the entrance of port D'Ilheo, entirely closing it to vessels, even the small coasting schooners.

Discolored water.—The water was observed to be very light in color in the vicinity of port D'Ilheo, and for a few miles southward of it.

This discolored water extended 2 to 3 miles from the shore, and the line of demarcation was clear and distinct between it and the blue water seaward; the depth at about ¼ mile inside this line was 13 to 14 fathoms, sandy bottom.

H. M. S. *Danae*, May, 1878, in latitude 24° 17′ S., longitude 14° 8′ E., about 90 miles southward of Walfisch bay, obtained soundings in 80 fathoms, dark sand and shells, the water discolored. This discolored water appeared to extend about 15 or 20 miles off shore, between cape Cross and Hollams Bird islet.

Conception bay.—The center of this bay lies in latitude 24° S., about 40 miles to the southward of D'Ilheo point; but it is a simple indentation of the coast, and affords no shelter whatever.

Hollams Bird islet.—This singular rock, which lies about 77 miles to the southward of D'Ilheo point, and 5½ miles from the mainland of the continent, is from ½ to ¾ mile in circumference, and about 40 feet high. The islet from observations made by H. M. S. *Sylvia*, lies in latitude 24° 37′ 30″ S., longitude 14° 32′ E., and from it a reef of rock, on which the sea at times breaks very heavily, extends about 5 miles in a southwesterly direction, while another, about 200 yards in length, runs off from the north end of the islet.

The reef is frequented by a vast number of right whales during the months of July and August, and the islet is resorted to by seals, gannets, and penguins. The islet is visited during the guano season (April–August). The landing is very difficult, often impracticable, and is usually accomplished by swinging with a rope's end attached to the top of a pair of sheers, which have been erected for shipping guano, and are conspicuous

when seen from seaward. A sounding of 8 fathoms was obtained at about one mile north of this islet, and the water in this direction appears not so deep as to the eastward; as the locality has not been examined, attention is called to this fact. So far as was observed, the bottom was even and sandy.

Capt. Morrell remarks that a vessel may lie at anchor on the north side of the island, in 10 fathoms water, all the whaling season in perfect safety, provided she has chain cables. The passage between the island and the continent has a depth of water from 20 to 10 fathoms near the mainland, and free from hidden dangers, excepting a reef which fringes the main shore abreast of the islet.

The water around its shores abounds with many kinds of excellent scale fish, which may be caught with hook and line in great quantities. A few turtles, also, may be found on a small sandy beach on the east side of the island. Anchorage may be had about a mile NE. of the islet, in about 13 fathoms, sand and rock.

Current.—When proceeding from Hollams Bird islet to port D'Ilheo, a current was experienced setting to NNE. at the rate of about $1\frac{4}{10}$ knots an hour.

Coast.—The coast from abreast Hollams Bird islet is sandy for about 24 miles to the southward, forming a bay with a low sandy beach, marked with black clumps of rocks, and terminating in a low point with a flat topped rock close off it. This rock is only to be distinguished from a vessel within 5 miles of the shore. North of the rock, some remarkable white patches are seen, which are very conspicuous with the afternoon sun. It is difficult to say of what these patches consist, for the whole country in the vicinity is of sand, but whereas it is generally of a yellowish appearance, these patches are quite white, coming down to a point toward the base of the hills, and spreading out above in a fan shape, or like a rudely formed letter T. Northward of these, the coast apparently curves considerably to the westward and becomes much lower, rendering it difficult to distinguish on account of the heavy surf and spray which envelops it.

Sylvia hill, situated about 13 miles southward of Flat-topped rock, is a conspicuous, sharp, double-peaked hill, which stands closely over a rounded point; when seen from the northward, Sylvia hill is not so conspicuous as it appears from the southward, but, being higher than the surrounding land, it will attract attention.

Easter cliffs, situated about 12 miles southward of Sylvia hill, are high and rugged sand cliffs extending about 3 miles, the intervening coast being sandy, and forming two slight indentations, behind which rise a monotonous range of hills.

Breakers extend off the coast immediately north of Easter cliffs for some distance from the shore, although no projecting point could be distin-

guished. The coast about here should not be approached nearer than 2½ miles, the soundings at this distance from the shore being 15 and 16 fathoms, even bottom.

Southward of Easter cliffs the coast is sandy for about 5 miles, forming a slight indentation and terminating in a rocky point which is not conspicuous. Southward of this point, the coast forms a bay 8 miles across and 2½ miles deep to the northern point of Spencer bay, there being several small sand cliffs about 2 miles south of the rocky north point.

The intervening range of coast hills forms an unbroken and somewhat high and level range of sand hills, about which there is no mark by which one may be distinguished from another.

Spencer bay is a considerable indentation in the coast, and may be known by Mercury island, which lies off the middle of the bay. Dolphin head, the SW. point of Spencer bay, is of most remarkable formation, being high, steep, and rocky, rising almost perpendicularly from the sea to a height of 600 feet; this, with the high cliffy land 3 miles in extent north of the north point of the bay, forms the most remarkable land along this coast. When seen from a few miles northward of Spencer bay, Dolphin head appears like an island, and bears a slight resemblance to the rock of Gibraltar; Mercury island appearing as a sharp edged white pyramid. From Dolphin head the north point, which is high and sandy, lies N. 20° E. (N. 48° E. mag.) about 4 miles, and this line just touches the inner end of Mercury island, within which the depth of the bay falls back about 2 miles.

Mercury island is a bleak, rugged rock, of an oblong shape, 130 feet high, ¼ mile in length, with a detached rock 50 feet high off its northward end, which is steep-to; but off the south end of the island a rocky shoal runs off about 400 yards. The sea at times beats against the shores of the island with indescribable fury, and rushes into an immense cavern through several apertures or rents, causing thereby an awful noise and commotion.

Landing.—During the guano season (April–August), when men are living on Mercury island, landing may be effected with comparative ease even in moderately bad weather, but at other seasons it would probably be attended with much difficulty. The landing place is just south of a narrow gully which separates the main part of the island from the islet off its north extremity. The only danger to avoid is a round topped rock which sometimes uncovers with the swell, and which lies close to the spot which a stranger would make for as being the best to run alongside of. The boat should run close northward of this rock, letting go an anchor off shore. Mercury island is composed of bare rock, very steep, and even precipitous in places, while the guano renders the foothold often precarious, not to say dangerous, unless care be taken.

Shoal.—The sea has been seen to break heavily in bad weather on a shoal lying ½ mile or rather more northeastward of Mercury island, but there is a considerable depth of water on it and it only breaks in a very heavy swell.

Tides.—It is high water, full and change, in Spencer bay at 10h. 50m.; rise of tide 5 to 6 feet.

Directions.—Ships can enter Spencer bay on either side of Mercury island, but if taking the southern passage, care should be taken to avoid the shoal reef off the south end of the island. The best anchorage is on the east side of the island about 300 yards from the shore in 6 fathoms water, sand and clay. Vessels loading guano lie a little over 400 yards from the shore. It is not advisable for ships to anchor on the south side of the bay, as it is seldom free from a rolling swell, and a heavy westerly swell heaves into it at the full and change of the moon, while vessels anchored under the lee of Mercury island are in comparatively smooth water. The winds are either fresh from SSW., or light northerly winds with fog; these last never blow with violence, otherwise this would be a dangerous bay to lie in. With SW. winds it is well sheltered by the SW. point, which is very high, though the wind sometimes blows over it in violent gales.

In bad weather the sea breaks over the beach for a considerable distance, and forms several lagoons in little hollows behind it, which are frequented by numerous flamingoes and other birds.

The average quantity of guano obtained at Spencer bay annually is 350 to 450 tons.

The interior of the country abounds in cattle, sheep, deer, bucks, wolves, gray foxes, elephants, and ostriches in greater numbers than it does further south. There are many salt springs in the valleys at the head of Spencer bay, where salt might be manufactured in immense quantities.

Coast.—At 12 miles southward of Dolphin head there is a conspicuous sharp-peaked Saddle hill, which stands immediately over the shore, and may be easily seen in clear weather from Ichabo island. Saddle hill, when seen from the northward, has apparently but one peak, and is only distinguishable as being the highest land in the locality. About a mile to the northward of Saddle hill the cliffs terminate, and the shore for 5 miles is formed by a sandy beach, gradually curving to the westward to another rather conspicuous cliffy headland, situated 9 miles from Saddle hill. Northward of this headland another bay is formed nearly 2 miles across, its shores being of cliff and sand, while at the northern extreme stands a rocky pyramid, prominent when seen from the southward, and which, when seen from the westward, appears as a flat-topped ledge. From here the coast is rugged cliff for 2½ miles to Dolphin head at the south entrance to Spencer bay.

The coast between Saddle hill and Hottentot bay is a sandy beach, rising at a short distance inland to a level range of sand hills. This beach is continuous except in two places, where there are small sandy cliffs close to the water.

Hottentot bay.—This bay lies about 25 miles from Spencer bay, and is about 2 miles broad, between Hottentot point and the mainland, and from this line the bay runs back to the southward about 2 miles, and affords secure anchorage, in from 6 to 4 fathoms, with good holding ground of sand and mud.

In 1880 there were the remains of a wreck on the beach at the head of the bay, a vessel about 100 feet long and 25 feet beam; a large portion of the wreck was covered with sand, but the bow and stern were uncovered.

The *Sylvia* anchored in Hottentot bay in 4 fathoms water, with the north extreme of Hottentot point bearing N. 85° W. (N. 57° W. mag.), distant nearly one mile.

Natives occasionally visit the bay for fishing, and sometimes ostrich feathers may be obtained in exchange for tobacco. Though generally armed with bows and arrows, they seem civil and harmless; the little water they had was brackish and carried in ostrich shells, and by signs they convey the impression that it was obtained far to the northward. There is abundance of fish, but no water.

The point of land protecting the bay is partly rocky and cliffy, but near the mainland the neck of the peninsula is low and sandy, so that Ichabo island may be seen over it from the masthead of a small vessel at anchor.

On the south side of the neck, distant about 1½ miles, is a small rocky islet, and here, during the laying and incubation season, numerous birds resort and plenty of eggs may be obtained. Seals also may sometimes be caught.

The islet is connected with the shore by Gallovidia reef, several parts of which are awash and others above water; it projects in a southerly and westerly direction from the peninsula, forming Hottentot bay, and lies nearly in the direct course from that bay to Ichabo. When coming from the southward this peninsula makes like two low bare gray isolated rocks, of which the northern one is a little the higher. Care should be taken not to pass within the depth of 9 fathoms, as it has been seen to break heavily in 8 fathoms.

Ichabo island.—The trend of the coast between Hottentot bay and Ichabo island is about S. by E., its general character being rocky, with occasional sandy beaches. Some points marked with rocks are prolonged into the sea by reefs, which in some places extend a mile off shore. Ichabo island, about 30 feet high, said to be composed of granite, slate, stone, and quartz, is about ¾ mile in circumference, and distant ⅔ mile from the nearest part of the mainland.

There are several offlying rocks, but all are above water, excepting a patch of sunken dangers extending about 200 yards off the north point of the island.

The main shore to the southward of Ichabo island is fronted by extensive and dangerous reefs, many parts of which, being under water, are not observable when the sea is smooth; at the distance of 4 miles southward of the island, the breakers around Marshall rocks extend 1½ miles off shore; and though within them there is a deep water channel, it is never taken voluntarily and should always be carefully avoided. Abreast of the island there is a landing place within Wreck point, but it is only available in the finest weather; and another in Douglas bay, protected by a rocky point, a good mile from the island in a SE. direction.

Capt. Sir John Marshall, C. B., of H. M. S. *Isis*, by whom the island and anchorage were surveyed in 1844, observes: "The bottom is generally rocky, with sandy patches, and consequently bad holding ground; many anchors have been broken in the rocks, and buoy ropes chafed through in a very short time. Heavy rollers set in, particularly at the full and change of the moon, when the whole surface of the anchorage is broken water, rendering it difficult to discern the reefs, and requiring much care in bringing up. The southward or windward entrance is the best in every respect, there being no danger but what is visible, and a vessel may shorten sail at leisure and run for a berth."

As the prevailing wind is from SSW., it is necessary to make the land to the southward of the island; but if a vessel should be driven to leeward by strong southerly gales, it is recommended to work along shore, standing in as near as it is prudent toward evening, and stretching out a part of the night, so as to be near the land an hour or two after sunrise, in order to obtain the advantage of the land breeze. When standing in between the parallels of 26° 15′ and 26° 25′ S., the mountains inland should be made out and steered for on a S. 84° E. (S. 56° E. mag.) bearing, when there will be no difficulty in making Ichabo island.

Ichabo can be seen for a considerable distance on account of the whitish yellow hue it has. On its highest point there is a flagstaff.

Anchorage.—This can hardly be termed a secure anchorage, though it is seldom that accidents occur if due precautions are observed.

The chief safeguard is to have ground tackle suitable to the ship's tonnage, for as long as they do not drag their anchors vessels are well sheltered by Ichabo island from the heavy swell that sets in, but when that island bears southward of WSW. the rollers are often dangerously heavy. The holding ground is not very good, being composed of sandy patches among rocks.

The *Sylvia* anchored off Ichabo island in 7 fathoms water, with Douglas point bearing S. 32° E. (S. 4° E. mag.), and Ichabo island, south extreme, S. 74° W. (N. 78° W. mag.).

Landing.—Landing to a stranger will often appear difficult; the best place to effect this is on the NE. extreme of the island, where a patch of kelp will be seen which materially assists in hauling up a boat on the shelving rocky shore. During the guano season, from April to August, there are usually men residing on the island, and with their assistance landing is occasionally effected with ease.

Winds.—Northerly winds accompanied by fog are frequently experienced, but NW. gales are of rare occurrence.

Rollers.—The rollers come in without giving previous warning, and it is no unusual occurrence for both entrances to break right across, leaving comparatively smooth water at the anchorage.

Village.—There is a Hottentot village of some size on the beach of Douglas bay. The water used by the natives is procured from about 8 miles inland, while that used by the Europeans is brought from Table bay, cape of Good Hope.

Ichabo, Plum pudding, Pomona, Possession, Halifax, and Mercury islands are visited every year for guano, which is collected in considerable quantities. The season begins in April and continues until August or September, when some of the men who have been employed collecting guano go in search of seals which frequent the rocks off this coast, while others return to the cape. Communication is maintained between these islands and the cape by schooners which sail at stated intervals.

In 1880 the total produce of these islands was said to exceed 5,000 tons of guano.

The breeze is frequently strong from the SW.; no rain falls, but dense fogs and heavy dews prevail, and occasionally lightning and thunder are experienced. The dryness of the air is so great as to produce disagreeable effects on the face, mouth, and eyes.

Tides.—It is high water, full and change, at Ichabo island at 1h. springs rise 6 feet and neaps 4 feet. The tidal current is imperceptible but usually a northerly current sets through the anchorage at the rate of a mile an hour.

Mr. Stabb, Master of H. M. S. *Grecian* in 1852, observes: "The whole islet is covered with innumerable quantities of birds, principally penguins, gannets, cormorants, and shags. The anchorage is insecure and dangerous; the best is close under the SE. part of the island, 100 yards from the shore, and immediately off a black rock. Here a vessel will be sheltered by the island itself from the swell setting in around it. The bottom also is a patch of mud and sand, while all the rest of the anchorage is more or less rocky.

"The wind blows through the channel at times with great violence. A dangerous blind rock lies northeastward ¾ mile from the island, and about ¼ mile from the mainland, with no passage between. This appears to be

the only hidden danger about the anchorage. Both channels, north and south of the island, are safe."

Staple rock.—Staple rock is low and black, lying ¾ mile from the shore, at about 7 miles southeastward of the entrance to Ichabo anchorage. It is often covered with seals, and is visited every year by a sealing expedition from the several guano islands.

Between Staple rock and the shore there is a passage through which vessels have passed, but it is highly dangerous, as the rollers which extend toward the shore often break without warning.

A low half-tide rock, with two others lying close off its south extreme, is situated 2 miles N. 62° W. (N. 34° W. mag.) of Staple rock, there being clear water between them and that rock.

Staple reef, extending WNW. from Staple rock, consists of sand banks, with patches of comparatively deep water between them.

Although the above dangers may be passed at a distance of less than a mile, yet the rollers extend much farther than that, and the water is often seen to break in 10 and even 12 fathoms.

From the north extreme of Staple reef, rollers extend in a northerly direction, more or less parallel to the coast, to the Marshall rocks, and although a vessel approaching from the southward might come along the shore inside of them to the entrance of Ichabo, it ought not to be attempted, except from necessity.

Marks.—The conical sand hill in line with a high rounded hill inland, bearing S. 81° E. (S. 53° E. mag.), leads southward of Staple rock, in 9 to 10 fathoms water, which depth, however, is too shoal for some circumstances which may arise on this coast, and to keep clear of the rollers a vessel should not bring this cone to bear so far to the southward.

The shore between Ichabo island and Angra Pequeña is not so utterly bare of distinguishing marks as other parts of the coast, but some offlying rocks near the shore, known to the sealers as Seventyfour and Eightyfour rocks, are conspicuous in making a break in the otherwise dreary waste of land.

In latitude 26° 28′ S. is a rounded rocky point, on which are two beacons, and a little farther north, on the beach, is the conspicuous cone of sand, already alluded to, which stands out very clearly when seen in the afternoon.

Angra Pequeña.—The western point of this extensive indentation (to which the term Pequeña, or small, seems a misnomer) lies about 23 miles SSE. of Ichabo island, and is known at Diaz point.

The bay itself is comprised between Diaz point to the westward, and Northeast point, distant from the former NE. about 6 miles; and within these boundaries there are several good anchorages, easy of access.

Little Orange river flows into Angra Pequeña bay.

Beacon.—On Diaz point a large cross has been erected in place of the marble cross erected by Bartholomew in 1486. From a distance the new cross might be mistaken for the flagstaff on Halifax island.

Shearwater bay.—About 3 miles to the eastward of Diaz point is Angra point, the shore between falling back 1½ miles to the southward, and forming an extensive bay known as Shearwater bay, where good anchorage may be obtained in 6 or 7 fathoms, fine sand, with good shelter from all winds excepting these from north and NW. H. M. S. *Sylvia* anchored in this bay in 5 fathoms water, with the north extreme of Penguin island open of Angra point, bearing N. 66° E. (S. 86° E. mag.) and Diaz point N. 64° W. (N. 36° W. mag.).

Angra point.—At the distance of ⅓ mile off Angra point is Angra rock, which is always above water; in the passage between there is a depth of 4½ fathoms, and it is safe and available, though by some it is deemed safer to pass the rock on its northern side, taking care to give it a berth of at least ½ mile, in order to avoid the extremity of the shoal plateau, which extends ⅓ mile off in a North direction.

Angra cove.—Within Angra point to the eastward is the inlet to which the name Angra Pequeña is properly suppose to apply, whose entrance is 1½ miles broad between Angra point and the north end of Shark island. The inlet runs to the southward for a distance of 5 miles, but not more than half that distance is available as an anchorage. Off Shark island there is excellent anchorage in about 4 fathoms, or a mile further up in 2½ fathoms, sand; and there is a good landing at the head of the inlet on its western side.

The reefs surrounded by deep water may be known at high tide by large quantities of seaweed growing on them, and at low tide their tops are visible. The manager of the German factory intends to place a beacon on them by which they may be known.

Islets.—From Northeast point, three islands, viz: Seal, Penguin, and Shark, extend in a south direction; of these, Shark island, the southernmost, all but joins the main shore at its southern point. Off its northern point, distant from Penguin island nearly a mile, a reef extends about ⅓ mile, and off the south end of Penguin island projects a similar reef, thus narrowing the navigable channel to an inner anchorage, known as Robert harbor, to ½ mile.

About ⅛ mile north of Penguin island is Seal island about a mile in length; but the actual channel between the islands, with depths of from 5 to 7 fathoms, is narrowed to ½ mile by shoal tongues extending from the extremity of each island.

The guano from the islands of Angra Pequeña is exhausted.

Penguin island is long, low, and rocky, its northern extreme being

apparently covered with guano, or whitish yellow-colored sand; in the middle of the island also there is another patch of similar appearance.

Seal island is higher than Penguin island and is round topped, with the northern extrémity sloping more gradually to the sea than the southern. There is a spar beacon on its summit, and the north part of the island has the same whitish yellow color as Penguin island.

The colored patches above alluded to are conspicuous in the afternoon, and could not fail in attracting the notice of a stranger, even when as far as 8 miles to the northward. They are seen some time before either Diaz point or Halifax island can be made out.

To the northward of Seal island the channel between it and Northeast point is narrowed to ½ mile, by a rocky shoal running out ½ mile from the latter. Within Seal island there is a space 1½ miles wide, with depths varying from 2¾ to 5 fathoms, sand, but the shelter is less perfect than that obtainable in Robert harbor.

Robert harbor is a good and well-sheltered anchorage, ¾ mile broad, between Penguin island and the main; and has a good holding ground of clay in from 3½ to 4½ fathoms. The harbor is accessible from north and south of Penguin island, but the latter channel with 5½ and 6 fathoms is preferable, as it is clear of danger, while the northern passage is contracted and rendered somewhat unsafe by Tiger rock, which does not always show.

Tiger rock, awash at low water, lies nearly in the center of the northern entrance to Robert harbor, at about 800 yards S. 67° E. (S. 39° E. mag.) of the north extreme of Penguin island. In the absence of a beacon to mark it, vessels should enter by the channel southward of Penguin island.

Beacons.—A cross has been erected on Nautilus hill (492 feet high) on the north shore of Robert harbor; it forms a good landmark.

Settlements.—A factory, belonging to a German firm, has been established in Robert harbor, close northward of Nautilus hill. There is a small pier in the harbor. No fresh provisions are procurable. Communication is kept up monthly with Cape Town by means of a small schooner, which also brings water at a cost of about $8 per ton.

Winds.—At Angra Pequeña the morning breeze is light from the northward, and in the afternoon fresh from SSW. The latter is sometimes very strong, and followed by calm intervals, with a heavy swell from the same direction. Violent gusts of wind from the SE. also occur.

Tides.—It is high water, full and change, in Angra Pequeña at 2h. 30m.; springs rise 8 feet.

Directions.—Diaz point is the best landmark in approaching Angra Pequeña. Seen from the SSW. at the distance of 5 miles the point appears like three islands, two of them of conical form; their dark tint makes them well defined against the hills in the depth of the bay, which

are of sandy formation and lighter in color. As the bay is approached the points terminating the different coves will be easily recognized, and also the three large islands, and the high mountains with rounding summits. Diaz point may be rounded within 400 yards; then steer direct for Angra point, and, if the wind is SSW., by keeping Angra rock open on the port bow, passage can be made between Angra point and the rock, and the anchorage reached either to the eastward of Shark island or in Robert harbor, without changing tack.

Anchorages.—The anchorage between Angra point and Shark island is considered preferable to Shearwater bay, in consequence of the violent gusts and squalls felt in the latter. Robert harbor, inside Penguin island, is better calculated for small vessels, as they have smoother water, and it is also very snug. The fourth anchorage is inside Seal island, but it has rather less water. This is entered by the passage between Seal and Penguin islands, and is the most secure of all, especially from June to August, when northerly winds prevail, and the rollers are most dangerous; the other anchorages of this bay, as well as most others along this coast, being then unsafe, and affording no shelter. Robert harbor is also well sheltered in these months. The southerly winds blow very hard here at times, and are succeeded by short intervals of calm when a heavy swell sets into Angra Pequeña.

Northward of Angra Pequeña there are two islets and a bay worthy of mention. Seventyfour islet or rock is a small islet about a mile from the shore, and the resort of fur seal, immense numbers of which are seen at sea a few miles from the land. Boat bay, 5 miles to the northward of Seventyfour islet, is a snug anchorage during the prevalence of southerly winds, and open only to north and NW. It is described as Hottentot bay in miniature; the ground is clear of all dangers, with a depth of 5 or 6 fathoms. Eightyfour rock, which also lies about a mile from the land, is 5 miles to the northward of Boat bay, and it resembles in all respects Seventyfour rock.

Guano bay.—The bay is bounded on its western side by Halifax island, ½ mile in length north and south, with a reef ¼ mile long off its northern end; the distance across the bay being 1½ miles in a SW. by S. direction. The bottom of the bay is composed of sand, but Halifax island makes from the southward like a range of black hummocks with a moderately high peak, and until a place was assigned to it on the chart was frequently mistaken by strangers for Diaz point.

There is a flagstaff and house on Halifax, or Guano, island, and during the guano season (April–August) a few men live there.

Halifax island is separated from the main by a channel 300 yards broad, but it is not available, as there is only a depth of 8 feet at low water springs. The *Isis* was anchored in 11 fathoms, but toward the island

the soundings gradually decrease; the bay affords shelter in southerly winds, but is quite exposed to those from the westward.

With a moderate gale from SW., experienced in Sylvia when entering Shearwater bay, a heavy swell was setting on shore, the spray being thrown up 40 or 50 feet high on Halifax island and on the west side of Diaz point.

Big bay lies about 4 miles southward of Halifax island, and is 1½ miles across, about ¾ mile in depth, with a sandy coast line; it affords no shelter, and the bottom within is foul.

Long, or Ludovic, island.—Abreast of Ludovic point, is the island of the same name; it is about 3 miles southward of Big bay, nearly 1½ miles long, and has one or two small rocky islets above water lying off the south extreme. It is almost divided into three parts, the sea breaking over it in two places, but there is no channel available even for boats.

The southern portion is about ¾ mile long, and is lower than the other two parts; the middle portion is the smallest, and the northern the highest of the three.

The channel between the north extreme of the island and the main is about ½ mile wide; the southern extreme is about ¾ mile from the main land, but the south channel is narrowed by an islet close to the shore being prolonged to the SW. by a reef, a mile in length, which is nearly connected with the rocks to the southeast of Ludovic island.

The anchorage in 8 fathoms, between the island and the main, is reached by the north channel, but the approaches are difficult, and the anchorage is often exposed to a heavy swell.

Abreast the island, on the mainland, is a conspicuous pyramidal cairn, visible in clear weather for 7 miles, and useful in indicating the position of Long island, which, being low and close inshore, is very difficult to make out from the offing.

Landing place.—At the head of the little indentation north of the conspicuous cairn is a small sandy beach, with a house close to it. This is used as a landing place and residence during the sealing season.

Atlas bay, about one mile southward of Long island, is separated from Adventure bay by a straight rocky coast 1½ miles in length; it is a ¼ mile wide, nearly ½ mile deep, and sandy, but affords no shelter.

Adventure bay is about ½ mile across, and ¾ mile in depth, with sandy shores and a small rocky islet close to the beach at its head. This bay is open to the westward, and affords no protection. From Adventure bay the coast is a straight rocky shore for 3 miles to Elizabeth point.

Elizabeth point lies northward, distant 3½ miles from the north extreme of Possession island, and is low and rocky, with a dangerous reef and heavy breakers extending to the southward for a distance of 1¼ miles. Eastward of Elizabeth point the shore is sandy.

Elizabeth bay is a slight indentation on the mainland within Possession island, about 2 miles across, with a beach of rock and sand, and under favorable circumstances boats are enabled to land on its southern side.

Possession island.—This island which shelters Elizabeth bay from the westward is about 85 feet high, 3 miles in length, with an average breadth of ½ mile; it is slightly curved in form, with its concave side toward the main shore, whence its northern point is distant about 3 miles, and its southern point nearly 2 miles. The shores of the island are rocky and nearly perpindicular. When seen from a short distance to the southward it appears as a cluster of islets with shoal water between them, for there are three or four peaks joined by low land, against which the sea breaks with violence.

Off the north end of the island there is a small rocky islet, and two small rocks, prolonged by a reef, extending ½ mile from the rocks in a northwesterly direction, and from the island the same reef runs out nearly 1½ miles in an easterly direction, and thence falling back joins the NE. point of Possession island. This reef tends to increase the shelter of the bay, the actual navigable channel between it and the rocks off Elizabeth point being 1½ miles.

The approximate position of its south end is in latitude 26° 58′ 30″ S., longitude 15° 12′ 30″ E., and near it there is a little cove with 3 fathoms water, and a landing place for boats.

Beacon.—A spar beacon stands on the southernmost hill on the island, and is, at a distance of 2 miles, difficult to distinguish from the background.

Commander W. Gordon, H. M. S. *Petrel*, remarks in 1868: "Possession island is tolerably conspicuous when approached from either north or south, though it is little, if anything, over 100 feet high in any part. On the south end is a staff with empty barrel on the top, which may be seen 5 or 6 miles off. There is a dangerous and far-extending reef off the SW. end of the island, rather than the SE., though I do not deny the existence of the SE. one."

Broke rocks.—These rocks form three rocky heads with 12 feet water on each; the two easternmost being upward of a mile within the NE. point of Possession island, and equidistant from the inner or westernmost rock, which lies ½ mile nearer the island. This latter rock was formerly known as Heliopolis rock, and lies north (N. 28° E. mag.) 2½ miles from the SE. point of the island.

Rock.—A dangerous rock, with 9 feet water over it, lies N. 40° E. (N. 68° E. mag.) distant ¾ mile from the beacon on Possession island; this position is approximate. Foul ground is reported to exist some distance to the north of this rock.

Tides.—It is high water, full and change, at Possession island, at 3h. (approximate); springs rise 5 to 6 feet.

Directions.—The southern channel is the best for entering, but should it be necessary to use the north channel and work toward the anchorage, it is better to keep toward the mainland until well to the southward of Broke rocks, when an anchorage may be selected as convenient, care being taken to avoid the shoal which extends ¼ mile off the southern point of the bay on the east side of the island, and the rock previously mentioned.

If entering by the southern passage, give the south point of the island a berth of one mile, and when the NE. point of the island opens out to the eastward of the SE. point, the shoal off the south end of the island will be passed, and a course may be shaped between the island and the mainland, and thence to the anchorage. When passing out through the north channel be careful to keep the SE. point of Possession island S. 28° W. (S. 56° W. mag.) until the northernmost rocks bear N. 70° W. (N. 42° W. mag.), in order to clear Broke rocks, and from the above position do not steer to the westward of N. 28° W. (north mag.) until the dangers off the north end of the island are passed.

General remarks.—Nothing can be more uninviting than the appearance of the coast between Walfisch bay and Possession island, which is composed of a long range of sand hills, excepting that portion between Spencer and Hottentot bays, where there is a range of high, barren, desolate precipices 600 feet high, more forbidding in aspect, if possible, than the rest of the coast.

Proceeding along the land between Angra Pequeña and Possession island, or when making the land from seaward, the position of the vessel may be confirmed by two remarkable peaks, already alluded to as the Paps, one being on a near and the other on a distant range of sand hills. In clear weather these peaks, which lie in about latitude 26° 50′ S., are very conspicuous, and may be seen from a distance of 12 or 14 miles, and when in line bear N. 51° E. (N. 79° E. mag.).

Winds.—During nine months of the year, from August to May, southerly winds prevail, and blow up with the regularity of monsoons, but are stronger in proportion as the south latitude increases, while to the northward, although the direction from SSW. to SW. continues the same, the breezes are more moderate, and at Walfisch bay land and sea breezes are experienced. The force of wind on the south coast, night and day, ranged from 5 to 9, while to the northward the range was only from 1 to 5. Short intervals of calm or light winds sometimes occurred after a gale.

Great care is necessary in approaching any of the anchorages to have the vessel under snug canvass, as a moderate breeze outside is no criterion of the wind likely to be met with inside, where it may probably be blowing a moderate gale. The wind appears to blow hardest at full and change of the moon all the year round, and gales generally occur at that time. The south wind blows hardest with a clear atmosphere and cloudless sky.

During the remainder of the year, from May to August, is the season for northerly winds. They are reported to be more irregular, and less strong than the southerly, but are succeeded by those much dreaded rollers which make the coast generally so unsafe at this season of the year. These rollers also set in occasionally after a southerly gale, but are not so heavy, and therefore not so dangerous.

Haze and fog.—A thick haze generally hangs over the whole of this coast during the early part of the day, particularly at the distance of from 4 to 6 miles off shore; but it generally clears off about 3h. or 4h. p. m. The breakers on the beach are frequently seen under the haze, while the land is barely discernible.

There is no rain during the southerly winds, but generally very heavy dews at night, with occasionally a very dense fog, and large drops of dew like heavy rain. A thick fog bank on the western horizon, with a well-defined line between it and the sky, is a sure indication of a strong southerly gale.

Current.—The current along the whole of this coast runs steadily to the northward at the rate of ¾ mile per hour, but at a distance of 40 miles from the land it appears to increase to 1½ miles.

Temperature.—The medium temperature of the air in the neighborhood of Angra Pequeña is about 63°, and at Walfisch bay 66°; but the temperature was invariably 4° or 5° lower on the coast than out at sea. The barometer on this coast ranges from 29·9 to 30·2 inches.

The following general observations on this portion of this coast are extracted from a work of exploration by Mr. Charles John Anderson:

"The prevailing local wind, extending from 60 to 200 miles from the shore, along the whole length of this coast, is from S. by W., to SW. by S. Indeed the south wind, varying considerably of course in strength, blows for about nine months in the year. During this time the sky overhead is clear and cloudless, though the horizon, with a space of from 14° to 20° above it, is often enveloped in so deep a haze that the land from eastward is completely hidden, and the approach to the coast thus rendered extremely difficult and dangerous. The sound—ay, even the sight—of the surf is generally the first intimation seamen have of their vessel's proximity to the land. During the remaining three months of the year the sea is often calm, or light breezes prevail from the NNW. These northerly winds are generally accompanied by dense and very damp fogs.

"In the summer season, when the weather is calm and the sky without a cloud, the sun is very powerful; but generally speaking, and more especially during the prevalence of the southerly winds, the temperature is very low. Thick woolen clothing is even necessary, for the wind is at times so keen as to peel off the skin of the face, and to make the lips sore.

The temperature never varies much, averaging during the year in the shade 50° to 60°.

"On all this coast it seldom or never rains. The dews, however, during the nights are heavy, and the thick fogs in the winter season saturate everything with moisture. After one of these fogs water will frequently drip from the rigging of vessels almost by bucketsful."

CHAPTER XVIII.

POSSESSION ISLAND TO CAPE ST. MARTIN.

Albatross rock.—About 2 miles to the southeastward of Possession island is Bol island,* which stands out flat-topped and dark against the coast, close to a rocky point of the same name; and about one mile further to the southward is Albatross rock, the largest of a group of small low islets, of volcanic formation, and about $\frac{1}{3}$ mile in length. Between the rock and the mainland the distance is about $\frac{1}{2}$ mile, and here good anchorage may be obtained in 6 fathoms with the center of the rock bearing S. 62° W. (west mag.); but from Albatross rock in a southerly direction a rocky reef extends upward of 2 miles, and unless intending to use the anchorage it is advisable to keep an offing of 4 to 5 miles.

At the distance of $3\frac{3}{4}$ miles from Albatross rock is Plum Pudding island, of a rounded form and red summit. The coast between these two islets is fringed with rocks, which are apparent from the offing, and some breakers appear about a mile to the westward of Plum Pudding island.

Prince of Wales bay is about 5 miles SSE. of Possession island. It is a small bay, but a safe anchorage for small vessels, being sheltered from the NW. by Bol point and Bol island. It is further sheltered by a sunken reef, which breaks except in calm weather, on the north end of which are 8 fathoms. There is a passage between the reef and Bol point for small vessels, by keeping close to the point. The landing is on a shelving sandy beach, and it is here the copper from Sinclair mine is shipped. There is a small wooden hut on the beach.

Pomona island lies about 12 miles SSE. of Possession island, and vessels may anchor off its north end in 4 fathoms; good holding ground. Between this island and Albatross rocks is a dangerous reef, about $\frac{3}{4}$ mile from the rock in a SSW. direction and extending a mile in a southerly direction. Coasters generally keep inside this danger, at the distance of a mile off shore, when running for the anchorage inside the Albatross rocks from Pomona island.

Caution.—Great caution is necessary when navigating in the vicinity of Pomona island and Albatross rock, as there appears to be something vague respecting the position of the reef, for Plum Pudding island was

*Bol island has disappeared. Lieut. Nugent, H. M. S. *Starling*, 1883.

formerly included among the Albatross rocks by Capt. Owen and hence the uncertainty whether the reef lies off Plum Pudding island or Albatross rock.

The coast.—From Pomona island the coast trends southeasterly for a distance of 53 miles to Roast Beef islets, and thence continues for about 60 miles to the Orange river, the northern boundry of the English settlements at the cape of Good Hope. The shore along the whole extent of this coast is most desolate in appearance, and without the least sign of vegetation, but the bones of whales are found strewn about in great abundance. The shore is studded with numerous small islets and reefs, about ½ mile off shore; but there are no dangers beyond one mile distance from the land.

Whale bay is merely an indentation in the coast, without any shelter, and anchorage even in fine weather is rendered unsafe in consequence of the shoal water in every part of the bay. Off the north point of the bay are two small islets, about ½ mile from the mainland, on which a few fur seal may be taken in the proper season; and outside these islets anchorage may be had during fine weather. The landing on the south side of the bay is good, and it is an eligible place for trading with the natives, who inhabit a small village which stands in a pleasant valley 10 miles inland. They frequently stray down to this place in search of shellfish, and will dispose of sheep, bullocks, and ostrich feathers on very favorable terms. The whole coast in this neighborhood is a complete sandy desert, with the exception of a few rocky hills of volcanic formation.

Arch rock.—To the northward of the Orange river the coast, as before remarked, presents a chain of rocks or islets, some of them bearing the most fantastic shapes. In particular, there is one gigantic rock in latitude 27° 31′ S., which seems originally to have been of some height and extent; but the sea, or some other cause, has carried away the whole of its center, excepting a surface of about 20 feet deep, which formerly rested on two extremities, forming between them a vast archway or natural bridge, upward of 100 feet high. The arch no longer exists, one side having fallen; it makes now from the southwestward, at the distance of a mile, as a pyramid, with a low mass of rock on its western side.

Angras Juntas, in latitude 27° 47′ S., is a small bight, 1½ miles in width, running back to the eastward about a mile. In 1828 it afforded shelter and anchorage, but at this time it is reported as filled up.

Plum Pudding island is a small island about 4 miles northward of Angras Juntas bay.

Sinclair island is the name of a small island lying about 2 miles southeastward of Angras Juntas bay.

Roast Beef islands.—These islands lie about 64 miles to the southward of Possession island, and are frequented by coasters for the purpose of

collecting guano. An anchorage is formed between them and the mainland, but it is not a good one, as there are several blind rocks inside and between the islands, and a heavy swell sets in at times.

These islets are low and rocky, and the point off which they lie is well defined, the coast falling back from it abruptly. This point is of peculiar appearance, being formed of sand hills, which do not rise to any great height, the highest being a smooth round-topped hill; in other places the lands appears to be almost perpendicular cliff.

From excellent observations obtained in the *Sylvia* about one hour before coming abreast of the point off which these islets lie, their position, as assigned on the chart, was correct.

Current.—In running along the coast, a current was experienced by the *Sylvia* between Roast Beef islets and Albatross rock, which set 10 miles to the northward in 12 hours. This current was experienced in the offing but not when near the shore.

Coast.—The coast northward of Orange river was found to be laid down with great accuracy. It extends as an undulating sandy plateau, upon which there are no conspicuous objects until, at a distance of about 25 miles north of the river's mouth, the land in the vicinity of the shore somewhat lowers, and when it bears about ENE., a flat-topped range is seen above it inland, and a much higher range, the summit of which is well defined, shows out at a considerable distance beyond to the northeastward.

This dip in the land on the coast has the appearance of a river bed; the southern rise when it bears southward of ENE., appears to terminate in a step, with a patch of sand below it, which tends to make it more conspicuous when seen in the afternoon.

There are some sand hills inland of this dip, their flat tops apparently consisting of bare sand, which shows clearly in the afternoon.

Northward of this the coast resumes its monotonous appearance for a few miles, when a break is seen to the northward, where the land, after maintaining nearly the same height for some distance, is lower, and slopes with three slight steps to an apparent point.

These steps on a nearer approach are seen to be sand hills, some of which are flat topped, while others rise to sharp peaks; these hills are more conspicuous when seen from the southward than from the northward, for in the latter case the sharp peaks being lower than the land behind them do not show out so clearly, though the vicinity of a high summit inland will serve to point out their positions.

Orange river.—This river, known as "the Gariep" by the natives, is one of the most considerable in southern Africa; it extends nearly across the whole continent from east to west, and forms the northern boundary of the British possessions, known as the Cape of Good Hope colonies. The source of the Orange river is in Kaffraria, and thence after traversing

the Hottentot country in a westerly direction for a distance of 900 miles, and receiving the waters of numerous important affluents, it flows into the Atlantic ocean, in latitude 28° 38′ 30″ S., longitude 16° 27′ 30″ E.

The mouth of the Orange river is barred by immense banks of sand based on a rocky plateau, extending 6 miles off shore, on which the sea constantly breaks, and landing is thus, rendered impracticable at any season of the year. Persons, therefore, wishing to communicate with the natives must land at cape Voltas, 6 miles to the southward. Around the mouth of the river the land is low, but at the distance of 8 or 9 miles in the interior are seen some hills, which further back rise into mountains, which flank the river, whose banks are inhabited by natives possessing large herds of cattle and sheep.

The fact of the river being barred is a serious drawback to the vast resources of the country it drains; and were it otherwise, and the river navigable, it would become one of the most important in South Africa, for rich and extensive copper mines exist near its banks, while there is reason to believe that gold is to be found in the mountains, as small quantities have been discovered in the bed of the river, as well as precious stones. The physical obstacles, however, by preventing the means of transit and embarkation, will, so long as they exist, prevent the resources of the country from being developed.

Alexander bay lies about 3 miles south of Orange river, and is considerably larger than Harrison cove, to the southward, which in shape it somewhat resembles. The entrance of the bay is wide, the sides being nearly parallel, and though open to the west, some protection is afforded by a reef of low rocks, which stretch upward of ⅓ mile across from its southern extreme. The bay has a good shingle beach, about 1,000 feet in length, but the bottom is rocky and uneven, and although quite deep enough for small craft, it is not to be trusted. A chain is stretched across from shore to shore, to which a coaster, which occasionally visits the bay, is moored.

A long sunken reef extends seaward from the north point of the bay, over which it is said that the rollers sometimes break very heavily. About 1½ miles to the northward may be seen the surf on the sands off the mouth of the Orange river. The outer anchorage would appear to be very dangerous for boat work in southerly winds, especially as vessels would generally consider it prudent not to anchor within at least one mile of the shore.

It may be seen, by the continuation inland of the line of sea-worn cliff on each side of the bay, that the latter was formerly about twice its present depth. The space between the actual beach and the rocky cliff which formed the bottom of the ancient bay is filled up with sand. The nearest drinkable water is about 4¾ miles distant, where the Orange river is fresh.

There is occasionally a strong set to the southward out of Orange river; the *Frolic* tended to it twice off Peacock roadstead, with a southerly wind; it is easily detected by the discoloration of the sea; the recollection of this before sending a boat from the vessel to the shore may sometimes be useful.

Cape Voltas.—This cape lies about 6 miles to the southward of the Orange river, the intervening coast being low, sandy, and desolate. Capt. Morrel in describing the cape observes: "The cape is a high bluff point, projecting into the sea, with several rocks lying about ½ mile to the westward of it, beyond which there are no dangers. About a mile to the northward of the cape there is a small bay (doubtless Alexander bay), not more than 2 miles in length and 1½ miles in width, within which the anchorage is not safe, as the ground is foul, and heavy rollers are continually heaving in from the westward, at all seasons of the year. Ships, however, which are in want of firewood, may lie off and on, and obtain any quantity from the head of the bay, where they will find plenty piled up on the beach, drifted down the Orange river, the entrance to which is about 6 miles to the north of cape Voltas."

Water.—"It is said there is no fresh water to be had on this coast, north of cape Voltas; but this is an error, as any quantity can be had in Voltas bay, in the rainy season, without the trouble of searching for it underground. By digging it may be had at all seasons of the year, at a short distance from the head of the bay, where the landing is very safe and convenient, sheltered by two small islands lying close to the beach, inside of which the water is perfectly smooth."

The coast.—From cape Voltas the coast trends S. by E. 11 miles to Wreck point, thence SSE. 55 miles to Buffels river, the intervening shore being high, while in shore the land rises into elevated mountains. The hillsides are covered with very good grass for the use of cattle, but the summits of these eminences are one mass of volcanic productions.

Peacock roadstead.—Commander Nolloth in his report of this place observes: "Peacock roadstead and its neighborhood may be easily recognized by two very remarkable rocky hills, called the Twins, which rise abruptly from the level ground, and whose lengths seem to run nearly at right angles to each other—the northernmost lying north and south, and immediately overlooking Homewood harbor. From Homewood, the coast, a sloping rocky cliff, runs northerly more than ¼ mile, when bending to the eastward for about ¾ mile, it affords considerable shelter of moderate area from the constant ocean swell and from the SSW. wind, which blows during so great a part of the year.

"A little beyond this, and where the coast again takes a northerly trend, is Harrison cove, which, from the bay, has the appearance of a quarry, but it is not very conspicuous. The sloping cliffs extend a short distance northward of the cove, where they terminate at the commencement of a

long sandy beach. Following the line of the coast to a distance of about 5 miles from the cliffs, is seen, in clear weather, a flagstaff, which marks the northern point of Alexander bay.

"The soundings in Peacock roadstead are regular, deepening from 4 to 5 fathoms at a few yards from the cliff, to 12 to 14 fathoms at a convenient distance for anchorage. Sandy mud was always shown by the lead beyond a few yards from the cliff. It appears to be of the same nature as the banks of the Orange river, with the addition of small shell at the deeper soundings."

Harrison cove.—(Commander Nolloth.) "This cove is about 100 yards in width; its entrance, which is nearly of the same breadth, is open to the NW. and has no reef. Being at the bottom of Peacock roadstead, it receives considerable shelter from the southwesterly swell and winds. The bottom is rocky, and the soundings uneven, and although there is sufficient depth, it is not safe anchorage for even one small vessel; but in very fine weather a small craft might be induced to let go an anchor outside, with a long scope, and haul in for a few hours for the convenience of loading.

"It is quite open to the NW. and it may be therefore supposed that in northerly winds it would be frequently unavailable for boat work; but during our stay it could have been almost always worked after the day of our arrival. A ledge of rocks entirely spoils a good, even, shingle beach, which is formed by high water at spring tides, and must render landing difficult at all times, excepting at a small sandy spot. There are also some loose rocks, which materially interfere with the present small landing.

"A gradual slope, apparently caused by a run of water, leads down to the south and most quiet part of the cove; it is nearly a continuation of the line of the beach, and its excavation would form a landing place or dock for boats, which would be shut out from the direct action of the sea, as it would be under the lee of the cliffs on that side; the material of the slope, below the worn, loose surface, seems fit for building purposes; close to along the sea cliffs is good hard level ground.

"Between the south point of Peacock roadstead and Harrison cove, where, from its receding, it appeared that a landing place in southerly winds might exist, there are several narrow chasms open to the northward, in one of which the water flowed to the distance of 200 paces from the edge of the cliff; we had been obliged to put back in attempt to reach the brig, yet the water within was almost undisturbed. Three of them were entered the next day; the weather was not favorable, but we pulled in and out of them without any difficulty.

"In one, there was sufficient space to wind the whale boat with her long steer oar over the stern, and in another the crew lay on their oars several minutes without the necessity of any movement to keep the boat from the rocks; generally, several boats could have remained close to the steep

rocks in about 7 feet water, with little or no effort to keep clear of them. Opposite these openings there is a proper depth and good bottom at a convenient distance for dropping an anchor to haul out by; and probably it would, in southerly winds, often be better to use these places nearly abreast of the anchorage, than to warp loaded boats up to windward from Harrison cove."

Homewood harbor.—(Commander Nolloth.) "The first view of Homewood harbor, under the northern Twin, is nearly circular, with receding sides rising from heights varying from 60 to 80 feet, and suggests the idea of an enormous ancient amphitheater. There is sufficient space on the south side, with about 12 feet water, for two small crafts to lie at all times in safety, if secured to proper moorings; the bottom is rocky and uneven. The entrance is open to the westward, and very narrow and difficult, having to be taken obliquely, as rocks project from the north side nearly halfway across.

"In very moderate weather, with a SSW. wind, there is frequently a heavy break right across; the south side is exceedingly well sheltered, the high southern side protecting it from the wind from that quarter, and the narrow entrance left by the rocks on the northern side being nearly shut in from the winds from the northward. The north side of the bay is rocky and shoal, and a sea is constantly sent into it by the slightest southerly wind, while the opposite is scarcely rippled by a strong breeze from that quarter.

"At about the middle of the bay a spur of rock runs out to a considerable extent toward the southern point; it has 9 or 10 feet alongside of it, and several large boats might load on its south side in perfectly smooth water. The beach at the bottom of the bay is of small shingle, and is conveniently steep for loading boats. The height of the side or wall in the rear of it must add considerably to the labor of landing and shipping goods, and must becalm outward-bound craft from the occasional land winds of the morning.

"A good sea breeze is required to enter with safety. The 'drawback' through an entrance so narrow in proportion to the water-space inside, must sometimes be very great; and a person who has several times visited it in a coaster informed us that so great is the difficulty of getting out of Homewood harbor that the average detention of a vessel throughout the year would probably be about eight days each trip; this detention, on such short trips as from Cape Town, would, if approaching the truth, materially lessen the value of this place as a port of shipment.

"A well has been sunk by a mining company to the depth of 20 feet at about ¼ mile from the coast, and as, at 18 feet from the surface, moist clay, which tasted fresh, was obtained, it may be expected that if the task be resumed, water will be found."

Soundings.—Soundings taken between Peacock roadstead and Alexander bay showed great regularity, gradually increasing from 3 to 4 fathoms at about 300 yards from the shore, to 15 and 16 fathoms as far as 2 miles from the coast, the bottom being of the same nature as that of Peacock roadstead. It would appear that a well-conditioned vessel, if not anchored too close to the cliffs, could put to sea from Peacock anchorage with any commanding breeze; in the southerly winds, which prevail throughout a great portion of the year, she would have no difficulty; with light winds from the westward, which are seldom of long duration, it must be difficult to make way against the swell which perpetually sets in. It is quite open to northwesterly winds.

Rollers.—It has been stated that the rollers sometimes break as far out as the line joining Harrison cove and Alexander bay.

Sunken reef.—Two hills known as the Twins, 403 and 520 feet high, overlook a rounded point about 4¼ miles to the southward of cape Voltas, and off the southern of the two, in a S. 50° W. (S. 79° W. mag.) direction, a sunken reef of rocks extends at least one mile from the shore. This shoal breaks with a heavy swell, but must be very dangerous to strangers, as frequently there is no break on it beyond a short distance from the shore.

About 3 miles southward of this reef and in a SW. direction from Sandkop, a hill 71 feet high, sunken rocks of the same character extend about one mile from the shore.

Soco reefs, a patch of rocks nearly a mile in extent and which usually break, are situated S. 40° E. (S. 11° E. mag.), distant 1½ miles from Wreck point, and about ¾ mile from the shore.

Holgat river.—From Wreck point the coast trends SE. for 8½ miles to Holgat river, off the northern point of which rocks extend about ½ mile.

Water.—There is a fresh water spring 4 miles up Holgat river, and fresh water may be obtained in winter at Jackals pit, on the shore, 8½ miles from Holgat river.

A rock which breaks occasionally is situated N. 32° W. (N. 3° W. mag.), distant 6¼ miles from Port Nolloth north point, nearly 2 miles from the coast, and is therefore a danger to navigation; between Holgat river and port Nolloth, rocks extend from ¼ to ¾ mile from the shore.

Port Nolloth (Robbe bay).—This little port is situated in a slight indentation in the coast, and a rather remarkable patch of reddish sand, on a range of conspicuous sand hills about 600 feet high and 5 miles inland, bearing ENE. of the port, may possibly be of assistance in identifying the locality. The south beacon is in latitude 29° 15′ 50″ S., longitude 16° 52′ 10″ E.

The port is formed by a reef of rocks, which partly dry at low water, and Robbe islet; the reef projects from the southern point of the bay, and runs

to the northward about ⅜ mile, keeping nearly parallel to the shore, and a little more than ¼ mile off it. This reef almost meets another one of the same nature, which runs to the southward from the north point of the bay; the passage between the extremes of these two reefs is about 350 yards wide, but this is nearly filled up by a rocky shoal called the bar, with 11 to 17 feet over it, and on which in fresh winds the sea breaks heavily; the breakers sometimes extend right across the passage.

Observation Spot.—The observation spot at the back of the Magistrate's house, nearly half way between the pier and Carl von Schlick beacon, is in latitude 29° 15′ 12″ S., and longitude 18° 52′ 02″ E.

Town.—The town is built along the low land which lies just above a good sandy beach abreast of Robbe islet; it has a customhouse and post office, and is becoming a place of some importance, being the principal shipping port for copper on this coast. There is a tramway which runs direct from the mines down to the pier, where a small vessel in fine weather may lie alongside and take in her cargo. Heavier draft vessels lie in the outer anchorage, where they are loaded by means of lighters carrying from 10 to 15 tons each.

Communication.—Port Nolloth is in telegraphic communication with Cape Town.

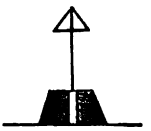
Supplies.—About 1,000 tons coal are kept in stock by the Cape Copper Mining Company. Small quantities are obtainable at about $13 per ton, delivered alongside in small lighters. Beef is obtainable at about 12 cents per pound; vegetables are scarce; bread in any quantity is obtainable at a day's notice.

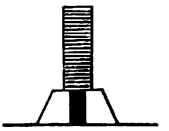
Water.—A great deal of water is obtained from the heavy dews which fall, and water is brought down every day from inland by the tramway.

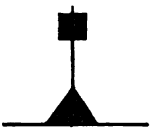
Anchorages.—The anchorage is inside Robbe islet, which lies within the southern reef and has deep water between; the islet is 3 feet above high water, about 120 yards long and 80 yards broad, and together with the rocks that extend from it on all sides and which dry at low water, forms a capital natural breakwater to the anchorage, in which vessels drawing not more than 8 or 9 feet may lie in safety, for although the sea may break heavily on the reefs and across the entrance, no heavy sea comes far within the reefs.

The best anchorage outside the reefs is nearly a mile off the bar, in about 23 fathoms, sand, with the white North beacon bearing N. 50° E. (N. 79° E. mag.), and the two South beacons in line S. 68° E. (S. 39° E. mag.), inside of this the bottom is rocky. This position is a favorable one for boats proceeding in or out of the port, with the prevailing wind. Vessels frequently roll heavily at this anchorage.

Beacons.—To assist in the pilotage of the port the following beacons have been erected; they are each distinguished by a letter, so as to make the directions more easily understood:


Beacon F.


Beacon E.


North (white) and South (black) beacons.

Bar buoy.—A buoy is moored a short distance within the bar in 27 feet, denoting the fairway, just south of the bar beacons in line.

Pilots.—A pilot may be obtained by making the usual signal, and strangers should not attempt to enter the port without one.

Directions.—A vessel drawing 8 or 9 feet can enter the port only at high water; the marks to cross the bar are the beacons E and F, and the Carl von Schlick beacon (a stone beacon 6 feet high near the shore), in line N. 65° E. (S. 86° E. mag.), a distant conspicuous patch is also in the same line; this will lead across in about 17 feet at low water, and when the North beacon bears N. 6° W. (N. 23° E. mag.) you will be over the bar, and may haul gradually round for the anchorage, steering so as to bring the outer South beacon a little open to the westward of the end of the pier, bearing S. 25° E. (S. 4° W. mag.). This will lead eastward of the Inner Blinder, a dangerous rocky shoal which covers at three-quarters flood, and is marked by a staff and cage; and of a 5-foot patch lying N. 40° W. (N. 11° W. mag.) nearly 200 yards distant from the end of the pier; in the passage between this patch and the shoal water extending from the shore there are only 9 to 10 feet at low water springs. Anchor a little to the southward of the pier in about 10 to 12 feet water, with the north end of Robbe islet bearing S. 78° W. (N. 73° W. mag.).

There is a very narrow passage through the reef in the southern part of the bay, with from 10 to 15 feet water; it is called the South channel, and through it the current enters which runs in the anchorage.

A channel along the shore to the northward of the pier, with an average depth of 11 feet water, was dredged in 1885. The prevalent current to the northward does not scour it, and in consequence it has silted up considerably.

Danger signal.—The signal "L. M. G," "Commercial code," is hoisted when it is dangerous to cross the bar.

Current.—The current in the port, which attains a velocity of ½ to 3 knots an hour, according to the strength of the SW. wind, enters by the South channel as before mentioned, and after passing through the anchorage, runs out to the NW. across the bar, and the southern part of the North reef, losing some of its strength as it crosses. Outside the reefs the current

runs to the northward, at the rate of ½ to one knot an hour, northerly winds check the current, and with a continuance of the same, it will run in the opposite direction, seldom, however, attaining a greater velocity than ½ knot per hour.

In July, 1891, the current was found to have a southerly set, at times attaining a rate of 3 knots an hour, dependent greatly, however, on the direction of the wind, and ceasing entirely with fresh southerly breezes.

Commander M. S. Nolloth, R. N., writing of this place in 1854, remarks

"We experienced much foggy weather here, which caused considerable hindrance, and prevented us from obtaining outside soundings; these fogs would occasion little or no obstruction to the loading of vessels and boats at the inner anchorage to the southward, which was always perfectly smooth, and which lies close to a good working sandy beach."

Rain.—In 1886, it rained only on 11 days, the total fall being 2½ inches; during February and March, November and December, no rain fell.

Tides.—It is high water, full and change, at port Nolloth, at 2h. 35m. springs rise 5¼ feet, neaps 3½ feet.

John Owen bay.—(Commander Nolloth): "Between port Nolloth and McDougall harbor is a very small indentation, called John Owen bay, which, although open to the SSW., seemed, in a strong breeze from that point, to receive considerable protection from the northern part of the reef of McDougall harbor; in northerly and westerly winds it must be very smooth; it has sufficient depth of water for small vessels drawing 8 or 9 feet, but the bottom is rocky. It has a conveniently steep sandy beach, and might, if the adjoining bay should be used, prove serviceable as a place of refuge in the event of the weather bar being missed. In fine weather, and at certain times of tide, there is, between the main and an islet, a boat passage, which is but a few minutes' pull from the boat passage at the south end of port Nolloth."

McDougall harbor.—(Commander Nolloth): "The south end of McDougall harbor is completely sheltered by a broad and in parts high reef, and we found it almost without a ripple when a heavy surf was breaking outside; but it can only be considered a dock, in which a small number of boats may lie in perfect safety at all times in 4 feet at low water spring tides. There is a small basin of deeper water, and sandy bottom, near the north end of an islet, which forms part of the reef, in which it appears that one or two small vessels might, in the summer season, generally lie in safety; and which at no time during our stay was much affected by winds from the southward. Such a place seemed scarcely worthy of further notice, after a few soundings had shown its shallowness; but as we were prevented for some days by the weather, especially by fogs, from leaving it in search of the entrance to port Nolloth, a plan was made of it.

"On a coast where a vessel or boat may run many miles after missing a bay without effecting a landing, any opening to even partial shelter may be important, and being close to port Nolloth, this small place may be hereafter turned to useful purposes; it has a sandy beach on which boats (perhaps small vessels, at high water) might be hauled up for repairs, etc., and the water is so smooth that a vessel might take the ground at low water without injury. A blunt pole was thrust nearly a foot into the sand in several places."

Water.—"There is a well of slightly brackish water on the beach near the house; when cleared out it filled again in less than half an hour; two others were dug near it, and we got the same kind of water at the same depth, 7 feet above the level of low water spring tides."

Tides.—It is high water, full and change, in McDougall harbor at 2h. 30m.; tide rises 5 feet 9 inches.

Penguin rocks, about 6 feet high, are situated 4½ miles northward of Buffels river, and nearly ½ mile off shore. Rocks which break with a heavy swell extend for a distance of ½ mile to the westward, and 1½ miles to the southwestward of Penguin rocks. The coast to Buffels river is foul for ½ mile off shore.

Buffels river.—The locality of this river (latitude 29° 40′ 30″ S.) may be recognized from seaward by a remarkable sand cliff or perpendicular gap of considerable dimensions, at the summit of a flat sand hill apparently 400 or 500 feet high.

When the sand cliff bears about S. 6J° E. (S. 40° E. mag.) it is hid by a nearer range of sand hills.

The river is at times accessible for boats in the rainy season, but only at high water, while in the dry season it is frequently closed by a sandy barrier, formed by the drift from the sand hills in windy weather.

Current.—In passing along the coast south of Buffels river, and at a distance of about 6 miles from the shore, a current was experienced which set the *Sylvia* nearly 40 miles to the nortwestward in 18 hours.

A rock which breaks with a heavy swell lies S. 4° E. (S. 25° W. mag.), distant 6 miles from Milkbosch point; and N. 80° W. (N. 51° W. mag.) 1½ miles from a rock 8 feet high near the coast; northward of which, sunken rocks extend nearly one mile from the shore.

Southward of this rock, the coast is foul ½ mile off shore for 10 miles, at which distance are two sunken rocks, about one mile apart and the same distance off shore, between which and Hondeklip river sunken rocks extend ½ mile off shore.

Hondeklip bay.—At the distance of 37 miles SSE. of Buffels river is Zwart Lintjes river, which is entirely barred by sand, and off which rocks extend for a distance of ½ mile; 3 miles further on in the same direction is Hondeklip (Dogstone) bay, which owes its name to an isolated block of

granite 17 feet high a few hundred yards from the shore, in latitude 30° 19′ 10″ S., longitude 17° 16′ 25″ E., and which serves to a point out the otherwise undistinguishable position of the bay.

It will be seen by referring to the plan that what may be termed the anchorage of the bay is only adapted for vessels of very small draft. Commander Nolloth in his report observes:

"Hondeklip bay is easy of access with the prevailing winds, and moderate weather generally prevails unless the wind should be from the westward, which is seldom the case. Usually, therefore, small vessels find little difficulty in putting to sea, by hauling out to, and making sail from, the weather point, or by sailing early with the light land wind, which frequently blows in the morning.

"The lead generally showed sand, both in the bay and at the outer anchorage, but, from the irregularity of the soundings, and the nature of the shore, it is to be feared that the latter has but a thin layer, here and there, over a rocky bottom. The *Frolic* anchored in 9 fathoms, sand, but her buoy rope was cut through, and the anchor worn by a rock. The best anchorage, outside, appears to be abreast of the entrance. To the southward there is a spot over which, it was stated, the rollers sometimes set very heavily, and a vessel was in imminent danger from having incautiously anchored close to it; it is an uneven, rocky patch, which is shown in the plan. The outer anchorage is quite an open roadstead.

"While at Hondeklip we experienced several of the thick fogs which during this season of the year are common on this part of the coast, and to the northward, especially in the early part of the day; but owing to the shortness of the bar, and its proximity to the outer anchorage, they occasioned little obstruction to the loading of a vessel outside, the winds, generally from the southward, being very light at the time.

"The bar was smooth enough to be worked by cargo boats at all times during our seven days' stay, excepting on one forenoon, with a light wind from the westward; it had been previously blowing strong from SSW. and SSE., when the bar was smooth; with a moderately strong breeze from NNE. it was perfectly smooth.

"The limited capacity of the inner anchorage, and the nature of the outer one, which is quite an open roadstead, with indifferent holding ground, and the exposure of both to the rollers and to the heavy westerly winds, which blow sometimes on the coast, seem to preclude the idea of Hondeklip being a very safe or a very important port of shipment; but the frequency, especially in summer, with which advantage can be taken of the facilities afforded by the shortness of the bar in ordinary weather, by the moderate distance of the outer anchorage, by the goodness of the beach, on which boats may be hauled up beyond the reach of the heaviest weather, and by other circumstances, is much in its favor."

Water.—"There is no fresh water at Hondeklip; that required by the few persons residing there, excepting a small quantity preserved during the rains, is brought from Cape Town. The brackish Zwart Lintjes river water is used for cattle."

Tides.—It is high water, full and change, at Hondeklip bay at 2h. 30m.; tide rises 5 feet 9 inches.

The following observations are by Mr. J. R. McDowell, master mariner, in 1864: "The first land desirable to make is a low hill about 17 miles south of Hondeklip, on which is a cairn of stones called Maclears tower (Roodewall stone beacon). The white sand patches on the coast below this hill present a very marked feature, being peculiarly forked. At the back of the tower, about 50 or 60 miles inland, high mountains can be seen on a clear day; the northernmost of the range is Kamiesberg, 5,000 feet high, and when Maclears tower bears ENE. the Kamiesberg will be about NE. It is not advisable to approach the coast too closely here, as several rocks and reefs project far out from the shore.

"Having made this land, if at evening, it will be prudent to heave to or keep under easy sail, with the ship's head off shore, as the current may sweep her past Hondeklip in the night; but if with good daylight and breeze, she can continue along the coast northward. The first peculiar appearance will be Roodewall bay, with its high precipitous red sandstone face. Roodewall bay is merely a boat cove 10 miles south of Hondeklip; and thence will shortly be sighted the White beacon, about a mile south of Hondeklip, which is reared on a rocky projecting point.

"A boat will always be sent off when a vessel approaches, should the bar be safe. The signal staff is in the bight of the bay near the jetty, and signals made will be duly replied to. The current on the coast usually sets to the north, but after a long continuation of northerly winds, it sets to the south."

Roodewall bay.—This bay (North point) is in latitude 30° 27′ 12″ S., longitude 17° 20′ 50″ E. Commander Nolloth observes: "The bottom is almost bounded by a perpendicular cliff of red sandstone of about uniform height—36 to 40 feet—surmounted by a sloping bank of white sand of nearly the same elevation. It is considerably deeper than Hondeklip, Homewood, or Alexander bays. It will be seen by referring to the plan, that it is open to the westward, and unprotected excepting by a rocky patch of 7 feet, which, while it frequently causes a heavy surf, nearly from point to point, diminishes considerably the force of the sea inside. The best and only clear passage is close to North point where there is from 4 to 7 fathoms, near the shore. Near the south point is a rock nearly awash; northward of this, the least water found on the bar south of rocky patch was 12 feet at low water spring tides, and, as will be seen by the soundings, deep water was carried across in several places.

"This bar is very uncertain, even in fine weather, and in a few minutes presents the contrast between a calm and a gale without any apparent cause. On one occasion, which was considered favorable for ascertaining the depth at an occasional break, it was only by fast pulling that the whale boat was kept ahead of high surf, which might have foundered a small vessel not battened down; and on another she was swamped on a spot which had shown no inclination to break, for more than a quarter of an hour. The long sandy beach at the bottom of the bay is not good; at low water it is steep, and beyond this the sea, in the finest weather, takes a considerable range over a shelving shore; the best part of it is at the southern extreme, but even here we never succeeded in launching the boat without shipping water.

"At high water, the sea must frequently reach the foot of the cliff, and there is not sufficient room for hauling up boats in bad weather; adjoining the sand at the south extreme there is a rocky flat, covered at about half tide, which would perhaps be the best spot in the bay for loading boats, if the same means were adopted as at Ichabo, and other places, viz: a platform upon trestles secured by a hawser fast to an anchor seaward, and set up by tackles on the shore.

"The small sandy beach on the north side is generally somewhat smoother, but it is not a good landing place, even in fine weather with a northerly wind. Boats might be hauled up at its western extreme where the cliff terminates. During our stay of 12 days, vessels might always have lain in perfect safety in the bay, even when a very heavy surf broke nearly across.

"The red cliff, with its crest of white sand, is easily recognized seaward when bearing about ENE., and must make a good point of departure for vessels passing to the northward, where the different parts of the coast, throughout a considerable extent are, owing to a great similarity of features, very difficult to be distinguished from each other. Brackish water is found by digging near the shore."

Tides.—It is high water, full and change, in Roodewall bay at 2h. 30m.; rise of tide 6¼ feet.

Spoeg River bay.—"About a mile to the southward of Roodewall the occasional river Spoeg empties into a sandy bay, which is much sheltered from the SW. by a patch of rocks about ½ mile from it; the soundings show an even sandy bottom, gradually shoaling from about 13 fathoms at a short distance from the rocks; and it is probable that there is a thick layer of sand, as the blade of an oar was thrust about a foot into it. The beach did not permit a landing during our stay at Roodewall; at about 100 yards from the shore there was always a considerable surf, immediately outside of which is a depth of 7 or 8 feet.

"The only landing place appeared to be on the rocky shore of the south side, about 200 or 300 yards southward of the river, but even there it would be necessary to adopt some contrivance for the loading of boats, as at low water they would be unable to approach within some yards of the shore. The sandy beach is nearly a mile in length. If means could be found to work boats in this bay, and if its position be at all central with regard to mining districts, it would be an important anchorage for ocean vessels in the summer season, and it seems worthy of a longer and closer examination than we were enabled to bestow on it. It is quite unprotected from the NW.

"The rocks which break the force of the southwesterly swell appear to be nine in number, this number of distinct breaks having been repeatedly counted; but in a fresh southwesterly breeze the breakers extend throughout the patch. The northernmost rock is S. 61° W. (west mag.), distant ½ mile from the south point of Spoeg River bay; it is only a few yards in extent, and has 6 and 7 fathoms around it. From it the path extends ½ mile in a southeasterly direction toward the south point of Spoeg River bay, and is about ¼ mile in breadth; from 7 to 9 fathoms were obtained close along the outer edge of the surf.

"There appears to be also a clear passage of about ¼ mile, with a depth of 4 or 5 fathoms, between the southernmost rock and the south point of the bay. This patch of rocks frequently shows no break; in a fresh breeze from NNW. there was but a slight break, once in about 20 minutes, on the northernmost rock, the water being quite smooth to the southward of it; a fresh breeze from SSW. causes a heavy surf on the whole patch. The soundings outside decrease very regularly from 20 fathoms, about ¾ mile seaward of the rocks, to 8 or 9 fathoms within a few yards of them."

Beacon.—"About 7 miles to the southeastward of Roodewall bay, and 2½ miles inland, is a beacon on one of the trigonometrical stations, used by the Astronomer Royal at the Cape, for measuring an arc of the meridian, and which, in clear weather, make a very conspicuous sea mark; it is on the bare granite top of a hill which rises rather abruptly on the north and south sides, the former being the steeper of the two. Mr. Maclear gives its exact position in latitude 30° 33′ 07″ S., longitude 17° 27′ 37″ E., and that the top of the beacon, a stone pile 14 feet high is 636 feet above the level of the sea."

Strandfontein point, situated westward of Roodewall stone beacon, has sunken rocks extending off nearly ¾ mile.

In concluding his report Commander Nolloth observes:

"Although the *Frolic's* visit to the coast in about the finest time of the year may have afforded us but little experience of its general character, yet, as it is considered to be frequently unsafe at all seasons, it may be stated that during our two months' absence we have only experienced a

close reefed topsail breeze for a few hours on two occasions; that the land has never been a lee shore except in a light westerly wind of short duration.

"Although we have had a considerable portion of foggy weather, which is said to be most common at this season, it has been accompanied by calms or by light winds, which has enabled us to anchor or to put the ship's head off the shore; we met no irregular currents excepting in the vicinity of the Orange river; and with regard to rollers, which are said to be of frequent occurrence at all times of the year, and which must be very dangerous to vessels in the small open bays, or anchored in bad holding ground near the shore, our negative experience is satisfactory, as we have seen no rollers properly so called.

"Generally, excepting near the latitude of Peacock roadstead, we found rocky bottom inside of 30 fathoms, and beyond this a gradually increasing depth, with a tenacious green mud to about 80 fathoms, at 15 or 16 miles from the shore."

Caution.—The coast between Milkbosch point and Bitter river, in latitude 30° 35′ 30″ S., also partially to Braak river, is fringed with sunken rocks, some of which extend as far as 1½ miles from the land. Great care must therefore be exercised when running along the coast toward any of the small bays situated between these latitudes.

Twins.—These sunken rocks which break with a swell are situated 4½ miles northeastward of Groene river and nearly one mile off shore.

Groene river, situated in latitude 30° 51′ S., and about 15 miles to the southward of Bitter river, is closed by sand banks.

Braak and Zout rivers.—The Braak river is situated in latitude 31° 06′ S., and has sunken rocks extending nearly one mile from the shore. Zout river is in latitude 31° 14′ 30″ S., and nearly 11 miles southward of the Braak. Both of these rivers appear to be closed.

When running along the land at a distance of 4 miles, the only conspicuous object seen on the coast between Braak river and Donkin bay was a large rock, apparently close to the shore, in the neighborhood of Zout river; eastward of Braak river, and about 14 miles from the coast, is Louis Fontein mountain, 1,859 feet high; there is also a very high range of hills at a considerable distance inland.

Morrell island, or Elephant rock, is 50 feet high, and lies about ⅓ mile from the shore, to which it is nearly joined by a reef of rocks above water; there is also a reef about 200 yards in extent running off from its western point.

Olifant, or Elephant, river.—This river empties into the South Atlantic, in latitude 31° 42′ S., and Capt. Morrell in describing it observes: "This river is not navigable for vessels, nor even boats, unless the sea is very smooth, as there is a bar stretching across its entrance, with only 2 feet water on it; and as the westerly swell is constantly heaving in on this

coast, there are generally heavy breakers on the bar. But within this bar there is plenty of water for a large ship, for the distance of 2 miles up the river in front of a small village, where several Dutch farmers reside. If there could be a passage cut through the bar at the mouth of this river, it would be the finest harbor on the west coast of Africa. The inhabitants are principally engaged in rearing cattle, only cultivating sufficient grain for their own consumption. Fish may be caught in great abundance in the mouth of this river within the bar."

The coast.—Capt. Morrell, writing of the coast to the southward of Olifant river, observes: "The land between Elephant river and St. Helena bay deserves a few descriptive remarks. Bluff sand hills moderately elevated are seen from 100 to 300 yards back from the beach. About ½ mile from the latter, the sandy ground begins to terminate and the soil to commence; and another half mile farther inland brings us to good soil where the plains are as fine for grazing as any in the world.

"Between the beach and the sand hills just mentioned, there is a fine road, running a great part of the distance between the two places. The whole coast along here exhibits unequivocal evidences of its once having been agitated by volcanic eruptions; such as lava in irregular masses, with different strata distinctly defined. Pumice stone is scattered over the country for many miles inland, forming irregular hills, interspersed with lava, basalt, and other volcanic productions. In pulling along this shore with my boats, I had ample opportunities of examining these relics, and making these observation."

Donkin bay.—About 15 miles SSE. of Olifant river is cape Donkin, to the northward of which is Donkin bay, where anchorage may be found in from 10 to 6 fathoms, sandy bottom; but as the bay is open to the west it affords no shelter. The bay is 7 miles across between cape Donkin and Thorn Bay point to the northward, and from this line the bay falls back 1¼ miles, the shores being composed of sand, on which the sea breaks heavily.

The coast in the vicinity of this bay is very level, and when 5 miles from the land there are few objects near the shore by which a vessel's position may be determined; inland there is a remarkable table-land of moderate height, which terminates in a perpendicular bluff to the northward. This is hid behind the nearer land when about 4 or 5 miles from the coast, and bearing about ESE.; although the bluff is sometimes seen when further to the northward, it would not attract a stranger's notice so readily as it does when seen from a position further to the southward.

Soundings.—At about 5 miles from the shore, northward of Donkin bay, the depths were found to be very regular (55 to 58 fathoms), the bottom consisting generally of mud.

Lambert bay lies 9½ miles southward of cape Donkin, and is situated in the southern part of a slight indentation in the coast. The bay is about a

mile across, and close off the northern shore is a small rocky shoal, called Fisherman ledge, with 3¼ fathoms on it. The anchorage in which small vessels may lie in about 2½ fathoms, sand, is formed by a small, low, narrow islet, which nearly joins the SW. point of the land and runs off about ⅓ mile to the NW., having a rock off its northern end. There is generally a heavy swell, and breakers form on some granite rocks which fringe the northern shore of the bay.

Many farmers reside near Lambert bay, and the neighboring plains afford ample grazing ground for numerous herds of cattle.

Strangers bound to Lambert bay should obtain the services of a fisherman or a coasting trader familiar with the coast, as no sufficiently accurate surveys have yet been made. The currents near the shore are not well determined, and the anchorage in the bay is very limited.

Between the islet and the mainland there is a boat passage, and between the islet and the smaller one to the northward there is also a passage about 20 yards wide, the depth in which is said to be 18 feet. This latter passage, however, is difficult to recognize, as the surf which fringes both the islets appears to extend into and to fill up the pass.

The depths on the inner side of the northern islet are great, but decrease rapidly to 24 feet; farther to the eastward and to landward they again increase, and then decrease gradually to the white sandy beach.

There is guano on the reef and shores of the bay and on the cliffs and islands in the vicinity. The right to collect it is let by the government to a company whose agent resides at Lambert bay.

Supplies.—The exports are the products of the region. The inhabitants bring their wares (butter, hides, grain, tobacco, and wool) to the beach, whence they are brought off in small boats, carrying from 50 to 70 sacks of about 200 pounds each, and in the ship's boats.

Water can be obtained. Fresh provisions must be purchased from the inhabitants residing well inland. Wood is probably scarce, as only brush and sand are visible.

Cape Deseada, or Baboon point (latitude 32° 19′ S., longitude 18° 19′ E.), when seen from 9 miles seaward appears bold and cliffy, rising at a steep slope from the water, and then extending in a flat-topped range of sand hills, 700 feet high.

A low sandy point, not easily seen, extends from the cape, and immediately north of it is a conspicuous sandy patch.

There is a fishery establishment in the bay northward of the cape.

Shoal.—A rocky shoal, on which the sea breaks in heavy weather, lies with its outer extreme bearing N. 54° W. (N. 25° W. mag.) about 3 miles distant from cape Deseada. Vessels approaching this part of the coast can not be too careful, as it has not yet been properly sounded.

St. Helena bay.—Cape Deseada is the NE. boundary of St. Helena bay, which extends thence as far as cape St. Martin, the SW. point, a distance of 31 miles SW. Although cape St. Martin is the most western part of the bay, Stamp Neus point, which lies eastward 3 miles from the cape (and is the NE. extreme of a peninsula projecting 1½ miles from the coast), is the actual western boundary of the anchorage. Between cape St. Martin and Shell Bay point, the northwestern extreme of the above-mentioned peninsula, the land falls back to the southward about a mile, forming what is known as Britannia bay. There are several farms scattered along the shores of St. Helena bay, and a good road connects them with Saldanha bay; the greater part of the way the road is only ½ mile from the beach.

Cape St. Martin is a low sandy point, projecting from the highland on the western side of the bay, and from it a reef of rocks extend to the northward about ½ mile. From a line between the boundary points, St. Helena bay falls back to the southward for a distance of 11 miles, the soundings being regular from 26 to 10 fathoms, decreasing to 6 fathoms about a mile off the shore in the western part of the bay, as far to the southward as the town, from whence the 5-fathom line extends to the eastward, keeping nearly parallel to the shore, and from 1½ to 2¼ miles from it; the bottom appears to be rocky inside this line to the eastward of Berg river.

The bottom is mostly composed of sand and mud; but a great part of the western side of the bay, from about ½ mile south of Stamp Neus point toward the mouth of the Berg river, is bordered with a fringe of rocks, some of which extend ½ mile off shore.

In the summer months, when southerly winds prevail, the water is entirely smooth in every part of the southern side of the bay; but as it is open from N. by E. to NW., it becomes unsafe in the winter months, when northerly winds may be expected.

About 5 or 6 miles from cape Deseada, the country rises to abrupt craggy eminences, and broken ridges of lofty hills, which extend to the southward, and terminate in the Piket Berg range of mountains.

Kapiteins Kloof, 3,410 feet high in the Piket Berg range of mountains, is very conspicuous from seaward. From a position 10 miles off shore the Kloof and its range appear as if close over the coast, and must not be mistaken for a higher range inland.

The Kloof is a well-defined summit; the highest part of the inland range is bold, its northern face appearing precipitous.

When bearing SE. the Kloof range appears as two sharp peaks close to one another, the eastern being the lower. To the right of these appears a rounded hill not quite so high, which slopes gradually, then rises again to a moderate height in a gradual slope, and terminates with the appearance of a rounded bluff, which, when seen from a distance, appears to slope down

to the water, the considerable tract of lowland between it and the sea not being visible.

Klein Tafel Berg, 1,190 feet high, 11 miles northward of Kapiteins Kloof, appears from seaward to be much closer to the beach than it really is.

It is a conspicuous object, being the only hill in the locality, though, as in the Piket Berg range, there is higher land behind it; some of the hills inland are table-topped.

Klein Tafel Berg rises from lowland on either side at a steep slope, it is table-topped, and rather uneven along its summit.

Berg river flows into the sea in the depth of St. Helena bay, nearly 9 miles from Stamp Neus point. This river passes through some of the richest lands in the Cape colony, and on its banks are some of its best wine districts, in one of which, the remarkably fertile vale of Drakerstein, is produced two-thirds of the wine supplied to the Cape. Its waters are peculiarly wholesome and well adapted for shipping.

Town.—A small settlement and military station, together with a church, is situated in a little bay about 4 miles to the southeastward of Stamp Neus point, and a fishing village lies along the shore of Stamp Neus bay which is about 1¼ miles inside the point of the same name.

North Blinder, or Martin rock, is a rocky ledge with from 5½ to 8 fathoms on it, and 21 to 26 close to all round; it is about one mile long, and nearly a mile broad, and, as the sea breaks on it in a heavy swell, must be avoided in bad weather. The shoalest part lies with cape St. Martin bearing S. 27° W. (S. 56° W. mag.) nearly 5½ miles, and Stamp Neus point S. 9° E. (S. 20° W. mag.) 4¼ miles.

Anchorage.—Vessels may select any position for anchorage between Stamp Neus point and the town in about 6 to 7 fathoms, mud and sand, at the distance of ¾ mile off shore. The best anchorage is in 7 fathoms, abreast of the town, with Stamp Neus point bearing N. 52° W. (N. 23° W. mag.) westerly.

Good anchorage may also be had about 3 miles off the mouth of Berg river in about 5 fathoms, on the line joining the right point of the river and Stamp Neus point, the latter bearing N. 60° W. (N. 31° W. mag.). This position is well adapted for vessels intending to water from the river.

Tides.—It is high water, full and change, in St. Helena bay at 2h. 30m.; rise of tide 6 feet.

Supplies.—Ships in want of fresh water should anchor off the entrance of Berg river, and send the casks into the river as far as the flood tide will take them, about 5 miles. Here let them remain until nearly the last of the ebb, when they may be filled. The next ebb will take the full casks down to the vessel, and the water thus procured will be found to be excel-

lent. There is a spring near the resident's house, on the south side of the bay, but the water is not good, producing diarrhœa.

The farmers residing on the banks of Berg river are of Dutch extraction, and devote their attention to raising grain and rearing cattle, horses, and sheep for the Cape Town market. They also produce wine of a good quality and a small quantity of brandy. Beef and mutton are very cheap, as are also nearly all kinds of fruits common to tropical climates, as well as a great variety of vegetables. Wood also may be had, but not of a large size.

Soundings.—The plateau of soundings along the portion of the coast comprised between Great Fish bay and the Orange river has not been sufficiently well surveyed to mark its limits with any great degree of accuracy. All along the coast the breadth of the bank is small; in some places the water is very deep close to the shore, while in others anchorage is impossible. Nevertheless the soundings, as a rule, will be found useful to mark the approach to the coast, and anchorage may be obtained on a bottom composed of sand and mud.

Winds, etc.—The seasons on this part of the coast are not very well defined. In the months of May, June, July, and August rain rarely falls; but during the remaining months of the year rain is occasionally experienced, and sometimes extends over several days, especially between September and March. Throughout nearly the whole year, along the coasts of Cimbebasia and Hottentotia, the breezes prevail from SSW. and SSE., and are sometimes very violent. During the months of May, June, July, and August the winds vary from SW. to SE., and generally moderate in force toward sunset. In the bays, easterly winds are sometimes experienced during the night, and occasionally light northerly winds.

The southwesterly winds, which prevail during the day along this line of coast, lose in intensity as the distance from the shore is increased; and about 100 leagues off they insensibly become merged in the southeasterly trades. Occasionally along this coast an easterly wind is experienced, resembling in its effects the harmattan of the northern hemisphere. It is of frequent occurrence between port Alexander and the Orange river, and brings with it heat of a most oppressive character; but the wind is not so violent as the harmattan. The strongest winds off this coast generally come from the SE., and sometimes blow with great force.

The winds will also be found to vary in intensity and direction north or south of the 25th parallel of latitude, which seems to be their natural limit. For instance, to the northward of this parallel, between it and the tropic of Capricorn, the winds blow from south and SSE., always fresh, and sometimes quite so, throughout the southern winter months; while to the southward of this parallel, as far as latitude 33° S., the winds generally

blow from SW. to south, and are generally of a more moderate character, though squalls are experienced from SE. and also from north to NW.

Along this coast also is experienced a very dangerous description of squall, which comes on without any of the usual indications attending an increase of wind, and therefore ships should always be prepared to reduce sail. They are known as white squalls, being in reality whirlwinds, which are rendered all the more formidable, as, by the absence of the usual signs, their advent can not be foreseen. The only indication of the approach of these squalls is to be found on the horizon, where the sea, lashed into foam, marks the approach of the coming danger.

Currents.—The currents along this coast generally follow the trend of the shore in a north and NNW. direction, with a velocity of about a mile an hour. But sometimes close in to the coast the current has been found setting SW. at the rate of 40 miles in 24 hours; these anomalies, however, seldom continue beyond two or three days.

Rollers.—Between capes Voltas and Negro, when the wind dies away or a calm ensues, and the sea becomes smooth, with a swell from the westward, bores may be expected, and vessels should keep clear of the coast. The rollers are very violent all along this coast, and the position of a ship becalmed close in shore is attended with danger.

There is always a heavy swell along the coast, generally from the SW., which keeps up a constant surf; and the effect of this swell acts as an indraught, against which vessels should carefully guard. It has been ascertained by actual experiment that, during a calm, vessels have been set toward the shore by the swell at the rate of ½ mile an hour.

Fogs.—Along this coast fogs of great density are frequently experienced, and therefore during their continuance it is necessary to keep a good offing, as the soundings are not always to be depended upon as marking the approaches to the shore. Generally the fogs are dissipated about 11 a. m. The refractions also are very remarkable, and likely to occasion grave errors in estimating distances, by distorting the appearance of the land and making it appear farther off than it really is.

CHAPTER XIX.

CAPE ST. MARTIN TO CAPE AGULHAS; AGULHAS BANK AND CURRENT.

Coast.—From cape St. Martin to the north point of Saldanha bay, the distance is 22 miles by the coast, which forms the arc of a circle with its convexity to the westward. The whole extent of this portion of the African continent, which has a general trend to the southward, is very rugged, and deeply indented; but none of the bays afford shelter, as they are all open to the westward, and consequently exposed to the heavy swell of the South Atlantic. There are also numerous offlying rocks which are very dangerous.

About 2 miles SW. of cape St. Martin, is Paternoster point, off which extend, 1⅓ miles to the westward, a reef of rocks and several small islets; the outer one is Seal island. There is also a sunken rock lying S. 66° W. (N. 84° W. mag.) about 1½ miles off the same point. Cape St. Martin and Shell Bay point in line clear these dangers.

Britannia reef is a rocky shoal, the highest part of which is visible at low water; inside the 10-fathom line the danger lies ENE. and WSW., 1½ miles long, and a little more than ½ mile broad. From the shoalest head, cape St. Martin bears S. 66° E. (S. 36° E. mag.) 3 miles. Shell Bay point and Stamp Neus point in line bearing S. 75° E. (S. 45° E. mag.), leads northward of this shoal.

Cape Columbine, or cape Castle.—At the distance of 5½ miles SSW. of Paternoster point is cape Castle, which derives its name from a peculiarly shaped hill surmounting the cape; the intervening coast falling back upward of 2 miles forms a deep bay, but it affords no shelter from westerly winds. Rocky reefs fringe the cape and extend nearly ¾ mile off, the outer one being visible at low water. Jim Crow rock (one foot above high water) is the NW. extremity of a rocky ledge on which the sea breaks in heavy weather, and lies N. 7° W. (N. 23° E. mag.) 2¼ miles from the cape; there are 18 fathoms water between the ledge and the before mentioned rocky reefs. A dangerous shoal with only 9 feet water on it lies S. 38° W. (S. 68° W. mag.) 1½ miles from the cape.

Northwest bay.—At the distance of 4¾ miles south of cape Castle is Duminy point; the coast between falls back about 1½ miles and forms Northwest bay, but this also affords no shelter from the westward. A

rock which is awash at low water, lies 1¼ miles outside the line between the two points forming the bay, and from it Duminy point bears S. 53° E. (S. 23° E. mag.) 2 miles; there is also a dangerous reef, part of which is awash at high water, running off SW. by W. 1½ miles from the same point, and in the center of the bay is a patch of 4 fathoms, one mile from the shore.

From Duminy point to Fish point, the whole coast is fringed by rocks and foul ground, extending upward of a mile off shore; several of the rocks are awash at high water, and the highest part of one called Jacob reef, situated S. 4° E. (S. 26° W. mag.), 3 miles from Duminy point, is 12 feet high.

Danger bay.—The entrance to this bay, which is semicircular in form, lies between Fish and Long points, a distance of 1¼ miles SSE., but this is contracted to only ⅔ mile, by the rocks which run off to the southward from Fish point. As this bay lies open to the westward, and there are several sunken rocks off the entrance, which sometimes break, it must always be dangerous to approach by a stranger, although a small vessel might in a case of necessity obtain an anchorage in 3 to 4 fathoms, about ¼ mile from the south part of the bay, well sheltered from SSW. winds.

Cap rock.—This danger, which uncovers at low water, lies west ⅞ mile from Long point, with 10 to 11 fathoms between it and the sunken rocks off the point. Schooner rock and the peak of Jutten island in line S. 53° E. (S. 23° E. mag.) leads westward of Cap rock; this mark also clears the dangers off the coast northward of the entrance to Saldanha bay.

Caution.—The greatest care must be exercised when navigating in the vicinity of the above-mentioned dangers, situated between Saldanha and St. Helena bays, as many of them rise almost precipitately from the bottom, having as much as 18 to 25 fathoms close to.

At night, a vessel ought to keep the deep sea lead going, and take care not to go inside of 50 fathoms; this depth will lead 3 to 4 miles outside of all danger.

Saldanha bay:—Close to the north point of this bay is Schooner rock, 22 feet high, and thence to South head, or Stomp point, on the south side of the entrance, the distance is 3⅝ miles. Within this line, the entrance channel, which has hills of from 200 to nearly 400 feet high on either side, runs in for a distance of 3 miles, where it becomes contracted between Houtjes and Eland points, to 2½ miles, but opens out immediately into an extensive basin 6 miles in length, affording good anchorage on its northern and southern shores.

Saldanha bay from its natural formation is admirably adapted for commercial purposes, and for the easy ingress of ships requiring the repair of damages sustained at sea. Indeed it may be said to be the only safe harbor on this portion of the coast.

Malagassen island (26 feet high), nearly ¼ mile long, and same breadth in its widest part, is low, and lies ¾ mile within Schooner rock, and nearly ½ mile off the northern shore; the island is surrounded with sunken rocks, and although there is a narrow passage of deep water within the island, this route should never be taken, as the bottom is foul, and the passage unsafe, especially with the heavy swell always setting in. The island should therefore be passed on its southern side, and not within ¼ mile, as sunken rocks extend some distance off.

Jutten island is 119 feet high, about ½ mile long, and lies 1¼ miles north of South head, and SE. by S. 2 miles from Malagassen island, the depths between being from 14 to 22 fathoms, sand and shell; but a little outside a line joining the two islands and nearly in the center of the entrance is Wasserfall bank, a small patch of 9½ fathoms, which breaks in heavy gales. Rocks extend more than ¼ mile northward from Jutten island, and fringe it nearly 200 yards off on the other sides. Between Jutten island and the mainland, the passage is ½ mile wide, with 10 and 11 fathoms water, sand and shell, and both shores may be approached to a little more than 200 yards.

Marcus island, 23 feet high and about ¼ mile in extent, lies E. by N. 2 miles from Malagassen island, and nearly midway between Houtjes and Eland points. Both these points are steep-to, but the island is foul for 300 yards off on the northern side and 200 yards on the south; a small rock 20 feet high, Hospital rock, lies off the latter side. The general depths between Marcus island and Houtjes point are 9 to 10 fathoms, but nearly in the middle of the passage is Blink Klip rock with 4¼ fathoms on it. The mark to proceed between this rock and Houtjes point is Schooner rock, well open to the northward of Needle rock, S. 66° W. (N. 84° W. mag.); the latter rock lies off the north end of Malagassen island. It must not be forgotten, that this leading mark leads over Barrack rock, with only 9 feet on it, lying ¼ mile S. 47° E. (S. 17° E. mag.) of North Bay point.

North, or Baviaan, bay.—This bay lies to the westward of Houtjes point, and is about one mile across, with good shelter from the NW. The only danger in entering this bay is the before mentioned Barrack rock, lying off its western point, but as Houtjes bay in its immediate vicinity is much superior in every respect, there can be no inducement for vessels using this bay as an anchorage.

Houtjes bay is the northern arm of Saldanha bay and forms a commodious anchorage, well protected by a rocky promontory terminating in Houtjes point; the only danger in rounding it, being a small rock which dries at low water springs, at the distance 100 yards north (N. 30° E. mag.) of the point. The soundings in the bay are regular from 4 to 5 fathoms, sand and shell, and there is deep water close to the western side of the bay; while the promontory forms a natural pier of granite formation

nearly a mile in length, where vessels sheltered from all winds may lie in perfect safety in all seasons, and if necessary be hove down without risk of injury.

In the northern part of the bay is the Seven Blinders reef, a small patch of rocks awash at high water, lying N. 26° E. (N. 56° E. mag.) a little more than 1¼ miles from Houtjes point; there are 3¾ fathoms close-to all round, and another small patch of rock with 3 fathoms on it lies S. 58° E. (S. 28° E. mag.) 400 yards from it.

Lynch Blinder rock.—This rock, which uncovers at low water springs, and is always breaking, lies about 2¾ miles S. 72° E. (S. 42° E. mag.) of Houtjes point, and N. 54° E. (N. 84° E. mag.) 2¾ miles from Eland point, which is in line with the northern extremity of Jutten island; also with the extreme of the point inside Schooner rock in line with the south end of Marcus island. The passage between the rock and the main shore is a little more than ¾ mile in width, with from 7 to 4 fathoms water Constable hill, in line with the west extreme of Schapen island S. 5° E. (S. 25° W. mag.), leads westward of the rock.

Schapen island.—At the south end of Saldanha bay is the entrance to a lagoon which runs back to the southward for a distance of 7½ miles. The entrance to the lagoon is ¾ mile wide, but in the middle is Schapen island, 48 feet high, ⅓ mile across, with a narrow deep water channel on either side, for which written directions would be useless.

A shoal with from 3 to 6 feet water extends ½ mile in a northerly direction from Schapen island; and the 3-fathom line, which commences at the western point of the entrance to the lagoon, and encloses Schapen island, extends to the NNE. for a distance of 1¾ miles, keeping about ¾ mile off the eastern shore; it then falls back to about 400 yards off, which distance it maintains all round the bay, excepting in the north part of Houtjes bay, where it runs off ½ mile. From the western point of the lagoon entrance, the 3-fathom line extends in a northerly direction for nearly 1¼ miles, enclosing the small island of Meuuw, and then falls to the north point of Salamander bay. A rock which uncovers at low water lies nearly midway between Schapen and Meuuw islands.

Settlements.—There are two small villages in Saldanha bay, and several farms along its shore a short distance inland; one of the villages is situated in Houtjes bay, and the other on Pofadder point, inside of Schapen island. From both these villages roads lead to the town of Hopefield, Darling, Cape Town, etc., and there is a weekly mail to and from the latter place.

Supplies of various kinds, including bullocks, sheep, pigs, fruit and vegetables may be procured at moderate rates from the various farms bordering Saldanha bay. Plenty of excellent fish may also be caught with the seine or hook and line. The best place to haul the seine is in

Riet bay, west of Schapen island, where the water is only 6 or 7 feet deep, over a sandy bottom; the other places are generally rocky and foul.

The land around the bay in many places is well cultivated, with the usual dwelling houses and farm buildings, and wheat, barley, oats, rye, potatoes, vegetables of many sorts, grapes, figs, peaches etc., all of excellent quality, are raised in great adundance. Fine crayfish are easily procured in any quantity, and the islands swarm with rabbits.

Water.—Excellent drinking water is obtained from a large reservoir on Schapen island, the water being carried to high water mark at a place which has 30 feet depth. Besides this supply there are many wells on the farms, and good water can be obtained by sinking wells a few feet deep.

Current.—The current appears to set fairly in and out of the entrance to Saldanha bay at the rate of about one mile an hour, but a short distance outside it runs to the northward from ½ to one mile an hour.

Winds.—The winds in Saldanha bay are generally from the south during the months of November and December; from the SSW. in January and February; from SW. in March and April; from the WSW. in May and June, and from west and WNW. from July to October inclusive. They then generally return to the southward during November, accompanied by squalls and heavy rains.

Tides.—It is high water, full and change, at Houtjes bay (Saldanha bay) at 2h. 30m.; springs rise 5 feet, neaps 3 feet 6 inches.

Directions.—Vessels intending to enter Saldanha bay will have no difficulties to contend against after the points of entrance have been identified, as there are no detached dangers to avoid, and those fringing the islands and points of the mainland will be cleared by keeping the moderate offing which common prudence would dictate. In this, as in all other places along the west coast of South Africa, the accuracy of a vessel's latitude is all important before running for an anchorage; but when certain of the locality steer in midway between Malagassen and Jutten islands, and passing to the southward of Marcus island, select an anchorage either in Houtjes bay or the southern arm.

The only danger in the channel to the northward of Marcus island, is Blink Klip rock, but by keeping Houtjes point bearing N. 38° E. (N. 68° E. mag.) until Schooner rock comes well open north of Needle rock, S. 66° W. (N. 84° W. mag.), and then steering on that line until Houtjes point bears N. 2° W. (N. 28° E. mag.), a vessel will then be past the rock and may steer in for the anchorage, but this route is generally avoided in consequence of the wind frequently falling light, and the constant heavy swell which sets a vessel toward the shores of North bay; it is therefore advisable always to pass to the southward of Marcus island. If intending to anchor in Houtjes bay, round Houtjes point a good 200 yards off, in

order to avoid the sunken rock already referred to, and a good position in about 5 fathoms water will be found about ½ mile from Houtjes point, with Marcus island just open. Vessels of light draft may anchor much closer in.

Vessels intending to anchor in the southern arm of Saldanha bay, should pass Eland point moderately close-to, and steer to the southeastward until Salamander point bears S. 84° W. (N. 66° W. mag.), and the west point of Meuuw island is just open of Camp point S. 2° E. (S. 28° W. mag.); in this position the best anchorage will be found in from 5 to 6 fathoms, sand. There is also a good anchorage for small vessels inside of Schapen island, but no stranger should attempt to reach it without the aid of a pilot.

In running for Saldanha bay during the night or in thick weather, care should be taken to avoid making the land to the northward of the bay, as numerous sunken rocks exist between the north point of the bay and St. Helena bay.

When leaving Saldanha bay it is better to weigh at sunrise, when the breeze is moderately fresh, and care should be taken always to pass to the southward of Marcus and Malagassen islands for reasons already given. After passing Marcus island, keep on the southward side of the entrance; a better position will thus be maintained in the event of the wind falling light, as the swell sets toward the northern shore.

Vondeling island.—From South head the coast falls back nearly a mile, forming Kreeft bay, in which there is no shelter from the westward. Stony head, the southern point of the bay, is nearly 2 miles from South head, and has a reef of rocks on which the sea is generally breaking, extending ½ mile off it. One mile farther to the southward is Vondeling island, about ⅓ mile long, and the same distance off shore. The intervening shore rises to a series of small hills, from 160 feet to 360 feet high.

The coast.—From Vondeling island the shore falls back a little to the eastward, and thence the low and sandy shore continues in nearly a straight line for a distance of 14 miles to Ijzer Fontein point, a rocky rounded salient point, fringed with a reef of rocks, and having close over it a hill 276 feet high. This part of the coast is safe to approach, having 6 to 9 fathoms not more than ½ mile from the shore.

Caution.—Reports have been made from time to time of currents setting on this coast. Vessels bound from St. Helena have in any case the currents on their starboard bow, which would have the effect of setting them in.

Dassen island.—At the distance of 16 miles SSE. of Vondeling island, and 5 miles SW. by S. of Ijzer Fontein point, is Dassen island, about 2 miles in length and 63 feet high near the south end. The island, though principally covered with sand, is based on rock, and is fringed on its north,

west, and southern shores by dangerous reefs, some of which extend a mile from the shore of the island. In addition to the reefs there are several sunken patches, the outer of which, South rock, with 5 fathoms on it, is about 1½ miles southward of the SE. end of the island.

Light.—On Dassen island, from a cylindrical iron lighthouse 80 feet high, a group-flashing white light is shown at an elevation of 155 feet, and should be visible 18 miles.

The light shows two flashes every 30 seconds, as follows: Flash 3 seconds; eclipse 4 seconds; flash 3 seconds; eclipse 20 seconds. The flashes have been seen 35 miles. There are keepers' dwellings about 60 yards eastward of it.

Caution.—Numerous vessels having been wrecked on Dassen island, mariners are cautioned to be particularly careful when approaching from the northward. The currents are variable in the vicinity of the island owing to its position between the coast current and the in shore eddy or counter current, whose limits are affected by the force and direction of the winds. It is probable that the eddy current frequently commences much further off shore than would appear from the charts, and at such times sets southward directly on Dassen island. The light should now give sufficient warning.

It is reported that a local custom prevails of showing a bright light at irregular intervals on Dassen island, for the use of tugs, without any general notice of the practice being made public; also that a limekiln on Ijzer Fontein point shows at times as a bright light a little northward of Dassen island.

The master of the steamer *Wallarah*, which was lost on Dassen island in the early part of 1891, asserts that it happened through his mistaking a bright light on Dassen island for the light on Robben island. It is stated that other vessels have been placed in great danger owing to these lights being mistaken for Robben Island light.

Southwest breakers.—There are also two sunken rocks with respectively 5½ and 6½ fathoms (least known depth) at low water, and on which the sea breaks heavily during and after bad weather, lying 3⅓ miles from the southwestern shore of Dassen island.

These rocks are WNW. and ESE. from each other, distant 1¼ miles, with deep water between. The western rock, with 5½ fathoms on it, is steep-to on the western side, 20 fathoms having been found at a distance of 200 yards. On its eastern side the bottom is very irregular for nearly a mile, the depths varying from 10 to 20 fathoms, crossing a confused and dangerous sea in bad weather.

From this rock the SE. point of Dassen island bears N. 38° E. (N. 68° E. mag.) 3¼ miles.

The eastern rock with 6½ fathoms on the shoalest part has depths ex-

ceeding 20 fathoms at 200 yards distance all round; from it the SE. point of Dassen island bears N. 18° E. (N. 48° E. mag.) 3½ miles.

A remarkable hollow rock, called Spout rock, lies on the western side of the island; in heavy weather the sea is forced through the orifice to the height of about 100 feet, and can plainly be seen over the island, while at anchor on the eastern side.

Waterloo bay.—Anchorage.—The eastern side of the island is clear of danger, and good anchorage may be obtained about ⅓ to ½ mile off shore, abreast the middle of the island, in from about 10 to 14 fathoms, sand and mud.

The channel between the island and Ijzar Fontein point is safe, care being taken to avoid Ronde Berg breaker, hereafter described. The reefs west of Dassen island are steep-to, there being from 20 to 26 fathoms close outside the breakers, with 40 fathoms about 5 miles off, and 110 fathoms at the distance of 10 miles from the island. Although this bank of soundings, which extends between Saldanha and Table bays may be of service to vessels beating along the coast, it is manifestly necessary to exercise great caution when in the vicinity of Dassen island, especially at night, as the reef is steep-to, and the positions of the rocks are not always marked by breakers. The best plan is not to go inside of 45 fathoms.

Currents.—Between Saldanha and Table bays in the winter months (June, July, and August), an eddy current sets to the southward at the distance of 4 or 5 miles off shore; a little outside this the current is constant and its general direction is to the northward, at the rate of ½ to one knot an hour, but between Table bay and Dassen island it will sometimes attain a velocity of more than 2 knots an hour. This current has a tendency to set a vessel toward the coast, especially during and after strong on shore winds, and should be carefully guarded against.

Bok point.—This point lies 15½ miles SE. by S. of Ijzer Fontein point, the intervening sandy coast falling back into an open bay about 3 miles deep, but without shelter. About two-thirds of the distance from Ijzer Fontein point are the Black rocks, two small islets close to the shore, and near them to the northward is the mouth of a small stream known as the Modder river.

There are 8 to 10 fathoms water nearly a mile from the shore, all round this bay, but a dangerous sunken patch of 4½ fathoms, called Ronde Berg breaker, lies 2 miles off the shore, 7 miles north of Bok point, and S. 75° E. (S. 45° E. mag.) 7⅓ miles from the SE. extreme of Dassen island. There are 18 to 20 fathoms close outside this danger, and 17 to 12 between it and the breakers about one mile distant, which here come a little farther out than in the other part of the bay. Bok point is rocky with a fringe reef, with numerous little hills a short distance inland. At 10 miles northeastward of Bok point the hills attain the height of 1,852 feet in Mamre

berg; with Kapoc berg 1,500 feet high, farther northward, and Dassen berg 1,368 feet high, to the eastward.

Matroos bay.—About 4¼ miles SE. of Bok point is Matroos point, and between these points the land falls back to the eastward more than a mile, forming two bays separated from each other by a rocky tongue of land fringed by a reef. The Buffels river flows into the southern part of the north bay. The southern one, known as Matroos bay, being open to SW. winds, affords no shelter from that quarter, and is seldom used as an anchorage.

From the south point of Matroos bay, the low and sandy coast trends southward to Melkbosh point nearly 8 miles distant. The soundings are very regular along this shore, having 7 to 11 fathoms one mile off. About 2 miles southward of Matroos point are the Seal ledges, a reef of rocks awash and extending ½ mile off shore. This part of the coast is of moderate height, barren and sandy near the sea, but the interior seems of better soil.

Robben island.—This island lies 25 miles SE. by S. of Dassen island, and 5 miles N. by W. of Green point, the northern extremity of the Cape peninsula, and forms an admirable landmark for the northern approach to Table bay. It is low, flat, nearly 2 miles in length, with a breadth of one mile. The island is fringed by reefs, which project fully 200 yards off its western side; but rocky ground, with from 5 to 11 fathoms over it, extends W. by S. for the distance of over a mile from the southwestern side, and on which the sea breaks heavily during strong breezes from SW. to north. This rocky ground rises suddenly from depths of 25 and 30 fathoms.

The NE. side of the island is free from danger, but the east and south shores are fronted by rocky ground, with irregular soundings varying from 2 to 4 fathoms, and marked by an abundance of seaweed. The 5-fathom line of soundings on the east and south sides is from 700 to 1,300 yards from the shore.

Landing.—There is a jetty on the SE. side of the island for the convenience of the lunatic establishment, and there is also good landing on the NE. side, in Murray bay.

Light.—On Minto hill, the highest and southernmost elevation on Robben island, is a lighthouse, 60 feet high, of a cylindrical form, painted white. It exhibits, at an elevation of 154 feet above high water, a fixed white light, which in clear weather should be seen from a distance of 20 miles.

Whale rock, upon which the sea breaks, except when very smooth or at high water, lies S. 15° E. (S. 15° W. mag.) $1\frac{3}{10}$ miles from the lighthouse on Robben island and one mile from the south extreme of the island. The vicinity of this danger is distinguished by seaweed, which adheres to

the rocky bottom, and the least water on the rock is probably 6 feet. Between the rock and the 3-fathom line off Robben island, there is a passage nearly ¾ mile wide, with depths varying from 3¾ to 7 fathoms, over rocky ground; but this channel should never be attempted by sailing vessels, except in case of emergency, as the currents are sometimes strong and uncertain in their direction about the rock.

Anchorage.—On the eastern side of Robben island, there is tolerable anchorage, sheltered from winds from SW. to WNW. The best position for a large vessel is with Whale rock (upon which the sea almost constantly breaks) open to the eastward of the south point of the island, bearing S. 15° W. (S. 45° W. mag.), and the north extreme of the island N. 69° W. (N. 39° W. mag.), in 8 or 9 fathoms water, sandy bottom. Smaller vessels will find excellent shelter on the above bearing of the northern extreme of the island, and with Whale rock just shut in by the SE. extreme of the island in 5 and 6 fathoms. Closer to the shore than this the ground is rocky.

Blaauwberg (Blue hill) is a dark round hill rising to an elevation of 745 feet, at 1¼ miles inland from the main shore opposite Robben island, and may be considered the northern boundary of the approach to Table bay. The channel between Blaauwberg beach and Robben island is 3¾ miles wide, but the narrowest part between the 7-fathom lines (within which no vessel should venture) is 2½ miles wide, with soundings of from 7 to 10 fathoms.

Salt river.—To the southward of Blaauwberg, the shore for 2 miles is composed of a number of white sand hills (100 to 192 feet high), at which distance rocks and breakers extend ⅓ mile off shore; it then gradually curves to the southwestward for 8 miles, to the mouth of Salt river. The whole of this space is very deceptive to vessels standing into the bay at night or in hazy weather, from the close resemblance the sand bears to the water.

The mouth of Salt river, which is fordable in summer but dangerous in winter, when it becomes an extensive quicksand. Another winter mouth to the river is formed eastward 3½ miles from Mouillé Point lighthouse; it is fronted by a rocky reef with 3 to 5 fathoms over it, the latter depth being at the distance of ¾ mile from the shore. The sea breaks over this spot after heavy NW. gales; with this exception, the water shoals regularly from 8 fathoms to the sandy beach between Blaauwberg and Salt river.

A range of tolerable even hills, called the Tygerberg, 1,357 feet high, and 6 miles in length, extends north and south 5 miles within the eastern sandy shore of Table bay. With the exception of Blaauwberg, these are the only elevations in the neighborhood of Table bay north of Table mountain.

The Cape Colony.—The cape of Good Hope, properly so called, is a promontory near the SW. extremity of the continent of Africa; but the extensive colony of that name is washed by the waters of the South Atlantic and Indian oceans. It is bounded on the north and NE. by the Orange river and the Orange Free state.

The cape of Good Hope was discovered in 1486 by Bartholomew Diaz, who named it Cabo Tormentoso, or Stormy cape; but King John II of Portugal, being convinced of its being the turning point of the long desired route to India, gave it the name of Boa Esperança, or cape of Good Hope, and his convictions were confirmed eleven years after by Vasco de Gama, who first rounded the cape. In 1620, two English East India commanders, by a proclamation dated from Saldanha bay, took possession of the cape in the name of Great Britain; but no settlement was formed.

In the year 1652 the territory was colonized by the Dutch East India company, under Van Riebeck, and it continued in their possession until the year 1795, when the British Government took possession, but at the peace of Amiens in 1802 it was ceded to its former possessors. In 1806 it was again taken by the English, to whom it was confirmed at the general peace in 1815, and has since continued a British colony.

Products.—The settlers at the cape are chiefly employed in the production of wool and wine; in the breeding of horses, cattle, sheep, and ostriches; and in the growth of wheat, barley, oats, and maize. The colony is rich in minerals, and diamonds are the most valuable of the exports.

The Cape peninsula is a remarkable promontory, extending about 28 miles north and south, and from 5 to 8 miles in breadth, with a varying height from 3,550 feet at Table mountain, and 3,200 feet at Constantiaberg, to but a few feet above the sea between Fishhook bay on the east and Chapman bay on the west; which lowland, however, is only visible on particular bearings. The neck of land connecting the peninsula on its NE. side with the main, and extending from Table bay to the head of False bay, is low, and about 11 miles across.

The Cape peninsula is rocky and barren, with a stunted growth of trees here and there; the fertile valleys, however, in the vicinity of Constantia and Wynberg are pleasing exceptions. From the westward, the peninsula appears high and rugged from Table mountain to within 4 miles of the cape of Good Hope, where the mountain chain terminates at Paulsberg, which stands over the north extreme of Buffals bay, on the east side of the Peninsula. From Paulsberg to Cape point the land is elevated and even, with the exception of two peaks at its southern extremity, which at a considerable distance make like a saddle island.

Soundings westward of the Cape peninsula.—The offing westward of the Cape peninsula has not been thoroughly sounded; but from what

has been done, it appears that at 4 miles from the shore there is no bottom at 40 fathoms, and off the high land NW. of Hout bay there is none at 40 fathoms 1½ miles off shore. From Hout bay to the Cape the water is less deep, the soundings varying from 24 to 10 fathoms, rocky bottom, at from one to 2 miles off shore. At the distance of 5 miles northward of the Cape, and abreast of the South Whittle western beacon, 10 fathoms, rock, were obtained at 1¼ miles off shore, and the sea breaks on this spot in bad weather. The precaution, therefore, of using the lead when approaching the Cape should never be omitted if doubt exists as to the accuracy of the vessel's position.

Table bay is an indentation on the northern side of the neck of the Cape peninsula, about 4 miles wide at its entrance between Whale rock and Green point, and sufficiently commodious to accommodate a large fleet. The bay may be easily known by the appearance of the contiguous high land, which, when seen from a long distance at sea, appears like an island.

Table mountain.—The bay derives its name from Table mountain, a remarkable and gigantic mass of quartzoze sandstone, rising to an elevation of 3,550 feet at the south part of the bay immediately over Cape Town. The mountain, which rests on a granite base 500 feet above the sea, is level on the top, and falls nearly perpendicularly at the east end, until it joins Devils peak, which is a rugged peaked mountain, 3,270 feet high, and separated from the former by a gap. The west end of Table mountain is also nearly perpendicular from its summit to a considerable distance, and is then united by an abrupt declivity with the base of a conical mountain called Lions head, which is about 2,180 feet high, and is in some places so steep that it can only be ascended by steps cut in the rock.

From the north side of Lions head a rounded ridge extends to the NE., where it reaches a elevation of 1,150 feet, and is known as Lions rump, upon which is a signal station.

Cape Town, the capital of the colony and the seat of government, stands on the western shore of Table bay, between it and the foot of Table mountain, and is well laid out, with numerous public buildings, several good squares, and contains a population of about 40,000.

The United States is represented by a consul and vice consul.

Breakwater and docks.—About midway between Mouillé point and Amsterdam battery, on the north side of Cape Town, a breakwater extends 3,640 feet in NE. and E. by N. direction, to a depth of 42 feet at low water springs. A coaling jetty 600 feet long and about the same distance seaward of east jetty has been built at right angles to the breakwater, which much facilitates the coaling of large steamers; additional wharf accommodations have also been formed between these jetties with depths from 21 to

26 feet alongside. Several buoys have been placed for the convenience of warping.

It is proposed to build a transverse arm 850 feet long, 700 feet seaward of the coaling jetty; also a pier parallel with the breakwater 1,500 feet long with a cant of 370 feet, having an entrance 240 feet wide between it and the transverse pier from the breakwater. This will, if carried out, enclose a considerable space, with depths from 26 to 35 feet, and afford ample protection from the dangerous northerly gales.

Outer basin.—At the inner end of the breakwater on the south side, is the inner basin 840 feet long, 260 to 380 feet broad, with an entrance 200 feet wide, in which there is a depth of nearly 21 feet. The depth at low water springs close up to the east jetty is 18 feet, gradually decreasing to 12 and 9 feet at the wharves on the western side of the basin.

It is advisable for a vessel to secure for the night alongside the East jetty, or Breakwater jetty, with her head out, a hawser, if necessary, laid out to one of the mooring buoys. If she is secured alongside the new quay wall, she would experience great difficulty in hauling off if a southeaster set in.

Caution.—Great care is necessary when entering the Inner basin, as there is generally a strong run, at times amounting to 4 knots, the direction being reversed perhaps in a few minutes. The coxswain of the port captain's boat usually acts as pilot, every assistance being given by the port captain from the shore.

Alfred docks, or Inner basin, lies close southward of and within the Outer basin. It is 1,000 feet long, 400 and 450 feet broad for two-thirds of its length from the north quay, the remaining portion being 250 feet broad; the width of the entrance is from 100 to 120 feet, with a depth of nearly 21 feet at low water springs. Inside the basin has a depth of 24 feet over the northern part, decreasing to 19 and 20 in the southern. Extensive warehouses and sheds, with cranes, etc., are erected around the basin, and a large smithy and factory are available for engine repairs. The basins are connected by a railway with Cape Town.

Vessels entering the basins, with the privilege of remaining therein for 30 days, including the day of arrival and departure, are charged at the rate of 12 cents per each registered ton; and for every week or portion of a week after the above period, at the rate of 2 cents per registered ton. Vessels wishing to enter must first communicate with the harbor master.

The number of vessels entering annually amount to about 900, registering about 900,000 tons.

Dry dock.—The Robinson dry dock lies at the NW. angle of the inner basin; it is 530 feet long over all, 500 feet on the blocks, 90 feet wide at the coping level, and 68 feet wide at the entrance, with a depth on blocks of 22½ feet at the upper end, 25 feet at the lower end, and 24½ feet on sill

at high water ordinary spring tides, and is capable of docking vessels of 23 feet draft. Vessels of heavier draft can lighten at the breakwater jetty. Depths at high water neap tides 2 feet less than above.

The length of the dock can be increased 11¼ feet by placing the caisson against the stop instead of the outer groove. The caisson can also be placed in an inner groove, thus forming a dry dock 274½ feet in length, leaving the outer portion for use as a wet dock.

The patent slip, at the south end of the inner basin, is capable of taking a vessel of 1,000 tons.

Communication.—There are about 1,650 miles of railway open in the colony extending eastward from Cape Town to the Kimberly gold mines, with branches to port Elizabeth, port Alfred, and East London; the latter is also in connection with Aliwal North.

Telegraph.—The principal towns in Cape Colony and Natal are connected by telegraph. From Natal a submarine telegraph cable is laid to Aden via Delagoa bay, Mozambique, and Zanzibar. Submarine telegraph communication between the Cape and Loanda is completed.

Loanda is connected with Princes and St. Thomas islands and places in the bight of Benin; thence with Europe.

Mails.—There is a weekly mail communication between England and Cape Town, the passage occupying from 18 to 20 days; also frequent communication between the ports of Cape Colony.

Supplies of all sorts can be obtained at Cape Town. There are water tanks for the convenience of shipping, which will be brought alongside at moderate charge. It is also laid on to the coaling jetty.

Tugs.—There are three or more tugs available at the port.

Coal is to be obtained in abundance at the coaling jetty and there is a contract for coaling men-of-war. It is put on board at the rate of 30 or 40 tons an hour. In the summer, vessels going alongside have to drop an anchor and swing with their head SE., then haul alongside. In the winter no anchor is required; vessels then lie with their heads to the northwestward. The harbor master invariably comes off and berths vessels.

Repairs to engines and boilers of all classes of vessels are undertaken by the various firms of engineers. There are no heavy forging facilities, but shafts of 40 feet in length and 18 inches in diameter can be turned.

Time signal.—A ball is dropped from a staff in the Alfred docks, 36 feet above the ground and 47 feet above high water (by electricity from the Cape observatory), at 1h. 30m. Cape mean time, corresponding to Greenwich mean noon.

A gun is fired from Inhoff battery (by electricity from the Cape observatory) at 1h. 30m., corresponding to Greenwich mean time noon.

The Cape observatory is situated in latitude 33° 56′ 03″ S., longitude 18° 28′ 40″ E.

Signal station.—There is a signal station on Lions rump, west side of Table bay.

Lights.—Breakwater.—Near the extremity of the breakwater works in in progress, on a traveling platform, a fixed green light is exhibited at an elevation of 25 feet above high water. It is visible through an arc of 225°, or between the bearings of S. 64° E. (S. 34° E. mag.), through west, and N. 19° W. (N. 11° E. mag.). Vessels are recommended to pass well to the eastward of the light, as in rough weather it stands further in from the end of the breakwater.

Green point.—A lighthouse stands upon Green point, the westward extreme of Table bay, at 400 yards within the rocks at low water. It is a square building 52 feet high, and exhibits at 65 feet above the sea a white light which shows a flash every 10 seconds, and should be visible in clear weather from a distance of 13 miles.

Mouillé point.—From Green point the land trends E. by N. to Mouillé point, the NW. horn of Table bay, upon which there is another lighthouse, at 100 yards within low water mark, and 1,195 yards from Green point. This lighthouse, which is a cylindrical shaft 30 feet high, painted in alternate red and white bands, exhibits at an elevation of 44 feet above the sea, a fixed red light, which should be visible in clear weather from a distance of about 10 miles.

A small fixed green light is exhibited during northerly gales, from a position a little to the southward of the inner part of South wharf.

Anchorage.—There is good anchorage for large vessels within and partly sheltered by the breakwater, in 6 fathoms, with Amsterdam battery bearing S. 37° W. (S. 67° W. mag.). Most vessels now go into the basin or lie at the breakwater jetties. The bay is not considered safe between May and October, but the breakwater works in progress are daily adding to its security.

Vessels should moor with long scopes of cable. The best ground tackle is required in the winter season when NW. and northerly winds prevail, and during gales caution should be taken to prevent surging ahead and slacking the cables between the gusts. It is from want of this precaution that most cases of parting occur.

Vessels touching for water and other supplies may ride at a single anchor, but it is particularly recommended to veer to 70 or 80 fathoms of cable as the chance of fouling or starting the anchor or breaking the chain will thereby be much lessened.

Two sets of moorings are laid down inside the breakwater; the northern set is for large vessels, and the southern for small.

Tides.—It is high water, full and change, in Table bay at 2h. 40m.; springs rise 5 feet, neaps 3½ feet. The duration of slack at high water varies considerably, and greatly depends on the prevailing wind; the

water is never stationary more than 30 minutes, and frequently it begins to fall immediately on reaching high water. There is no sensible stream of tide, either in the bay or on the adjacent coast. The time of high water and its rise is nearly the same at Simons bay, and all the bays along the coast from the cape of Good Hope to cape Agulhas.

Current.—A current varying in strength from ½ knot to 2 or 3 knots sets to the northward past Table bay and Robben island, but during the winter months, when NW. winds prevail, a current sets into Table bay from the NNW., and impinging on the SE. shore of the bay, about Salt river, divides into two streams, the one setting northward along the coast and out between Robben island and the main land at Blaauwberg, while the other takes a westerly course as far as Cape Town castle, then northerly, sweeping the SW. shore of the bay, and carrying away loose soil from the south sides of the jetties and projecting rocky points.

During the summer season it has been observed, particularly during southeasters, that a gentle stream sets round Mouillé point to the SE. into the bay, and out by the Blaauwberg beach, as in the winter. The rocks about the beach from Green point to the Amsterdam battery are bare, and always free from sand, but in the depth of the bay, from the Castle to Salt river, vast quantities of sand and seaweed are removed from the beach by the drawback of the rollers, and carried away by the current, leaving the seashore a platform of solid rock, which is again covered up to the depth of 2 to 3 feet during the summer months.

Directions.—Vessels steering toward Table bay during the summer months should shorten sail before hauling in for Green point, as southeasters blow hard on opening the bay. If compelled by a southeaster to bear up from Green point, in order to seek shelter under Robben island, take care to avoid the Whale rock, and bring up on the eastern side of that island, under easy sail. With ordinary precaution, there is little probability of a ship losing an anchor in bringing up in this place of shelter; but should she part in trying to bring up during a southeaster, there is an open sea to leeward.

Vessels entering Table bay during the day when blowing hard from SE., after passing Mouillé point, may with great advantage anchor in 10 or 12 fathoms, where they will be in a good condition for dropping into the inner anchorage on the following morning, as the wind invariably falls light there during the night, although the SE. wind may continue to blow hard on the east side of the bay. By observing this rule, more particularly in ships of large tonnage, much anxiety and risk in wearing ship, when missing stays will be avoided, and less casualities occur from loss of anchors and cables when endeavoring to bring up on the eastern shore.

During daylight, a vessel may round Green and Mouillé points in 10 fathoms water, but these points, which are low and fringed with outlying

reefs, are liable to prove defective as to their distance. It is, therefore, advisable to give them a berth of at least ½ mile until Mouillé point is passed (which may be known by the Devils peak being open eastward of the lighthouse), when there is very probability of being boarded by the port boat, and a berth given by the harbor master.

There can be no excuse for neglecting the lead in entering Table bay, the greatest depth of water in mid-channel between Green point and the Whale rock being 20 fathoms, and from which, toward the beach, the soundings gradually decrease. The bottom is foul and rocky to the NW. of a line joining the Lions head and rump, but east of this it is clear, and a vessel may, if necessary, anchor in any part in from 8 to 10 fathoms, sandy bottom.

Caution.—In dark or hazy weather, ships should never fail to use the lead in standing into the bay. For want of this precaution vessels have sailed on to Green and Mouillé points without seeing land, while their masts were seen over a fog from the elevated ground at the foot of Lions rump. The fogs that obscure the lights are frequently confined to the low ground in the vicinity of Green and Mouillé points, extending upward only 100 to 150 feet. Under these circumstances it is advisable to send a masthead man aloft, who will probably see land when it is invisible from the deck.

At night.—Vessels bound for Table bay from the southward, should not shut in Cape Point light with the land at Slang Kop point, until the fixed white light on Robben island (which will be seen before the flashing white light on Green point) bears N. 21° E. (N. 51° E. mag.), when they may steer for it; and when Green Point light bears N. 60° E. (east mag.), a N. 38° E. (N. 68° E. mag.) course may be followed until the fixed red light on Mouillé point bears S. 64° E. (S. 34° E. mag.). This route will clear Vulcan rock and all dangers between it and Table bay.

The course may now be altered to east (S. 60° E. mag.), which will lead one mile northward of Mouillé Point light, and within this distance no stranger should round the point at night. When Mouillé Point light bears S. 7° E. (S. 23° W. mag.), a course about S. 47° E. (S. 17° E. mag.) may be steered for the anchorage, bearing in mind not to approach the green light on the end of the breakwater too close.

From the northward having sighted Dassen island light, which must not be approached within 7 miles, vessels should stand to the southward until the light bears S. 49° W. (S. 79° W. mag.) when Robben Island or Green Point light may be steered for. When Green Point light (flashing every 10 seconds) is made, bring it to bear S. 53° E. (S. 23° E. mag.) and stand in on this bearing until Robben Island light bears N. 15° E. (N. 45° E. mag.), when steer S. 75° E. (S. 45° E. mag.), and when Mouillé Point light bears S. 7° E. (S. 23° W. mag.) proceed as before directed.

Entering Table bay from the northward, and inside Robben island, keep Mouillé Point light about south (S. 30° W. mag.) until past Robben island, with the lead going. In passing this island, soundings in 7 or 8 fathoms may be struck. When the water deepens to 11 or 12 fathoms, or Robben Island light bears N. 53° W. (N. 23° W. mag.) steer about S. 19° E. (S. 11° W. mag.) for the anchorage. It is however, not prudent for a sailing vessel to enter the bay by this channel, on account of the northerly current.

In beating between Robben island and the main, the soundings shoal regularly toward the island; but when approaching the main, it is necessary to tack at the first cast of the lead in 8 fathoms.

With Robben Island light and Green Point or Mouillé Point light, a vessel may readily determine her position by cross bearings; but in working for the anchorage the safest and easiest plan to adopt is, while Green and Mouillé lights are open of each other, to tack when Robben Island light bears N. 50° W. (N. 20° W. mag.) (avoiding Whale rock), and when they approach each other or become in line, to tack when Robben Island light bears N. 41° W. (N. 11° W. mag.). 'This will prevent accidents from the Blaauwberg beach, on the eastern shore of the bay, which is very deceptive at night.' Little, if anything, can be lost in thus beating in, by giving up the smooth water near the shore, as a constant northerly current sets out between Robben island and the mainland; added to which the wind blows with greater violence from the SE. on the east side of the bay than it does more to the westward, though not in such sudden and violent gusts.

Strangers are not recommended to beat into Table bay at night, especially in squally or thick weather. Under any circumstances at night there is great difficulty in judging the distance of lights situated under high land. Therefore, the prudent course for a stranger is to keep off and on outside, until daylight, sufficiently to the westward of Green point, to prevent being becalmed near the land, and set in upon the coast by the heave of the sea.

Leaving Table bay.—Vessels leaving Table bay and bound to the northward should pass between Robbin island and the mainland to the eastward. An almost continuous current sets to the northward through this channel, and during the summer months a fresh southeaster frequently blows, while a few miles to the westward of the island the wind is light and baffling or fails altogether.

Port signals.—The following signals will be shown when, from local experience and good barometers, a severe gale may be expected. It is strongly recommended that they may be promptly observed when made from the port office; and any neglect in the observance of them will be reported to the agents for Lloyd's, as also to the owners of the vessels disregarding the signals.

White pierced blue, over union jack.—Clear hawse, and prepare to veer cable.

Union jack over white pierced blue.—Veer to a whole cable, and see the third anchor clear.

Blue, white, blue, horizontal, over union jack.—Down topgallant yards and masts, and point yards to the wind, and see everything clear for working ship as far as practicable.

Union jack over blue, white, blue, horizontal.—Strike lower yards and topmasts, and rig in jib booms.

Union jack over No. 3, white and red, vertical.—Shorten in cable to same scope as when first moored.

When it is considered necessary to make any of the above signals, it is strongly recommended that all commanders immediately repair on board their respective vessels, and that the above signals may be answered by hoisting the answering pennant, or the ensign at the peak end or any of the mastheads.

The above signals will be repeated from the Lions Rump signal station.

Vessels can make their wishes known to their agents in blowing weather through the port office by the international code, and any assistance required will be strictly attended to, as far as practicable.

Should vessels part from their anchors during a northerly gale, and can not work out, they are strongly recommended to run for the green light, shown on the shore between the castle and inner end of South wharf, and beach close to the southward of the Castle ditch, the crews remaining by their vessels, by which means little or no danger of life is to be apprehended. It is also recommended that, in the case of such vessels taking the ground, any after-sail that may have been set in running for the beach should immediately be taken in, keeping the foresail or fore-topsail set, as the case may be, until the vessel is firmly grounded.

The following signals may be made from the most convenient point to vessels that are stranded.

In day time a number will be shown, white upon a black ground. At night, the number will be shown transparent.

No. 1. You are earnestly requested to remain on board until assistance is sent; there is no danger to life.

No. 2. Send a line on shore by cask, and look out for line from rocket or mortar.

No. 3. Secure the rope; bend a warp or hawser to it, for us to haul it on shore for the boat, or for us to send you a stout rope, to be made fast to some firm part of the wreck, that we may haul off a boat for bringing you on shore.

No. 4. Lifeboat will communicate at low water or as soon as practicable.

No. 5. Have good long lines ready for lifeboat, and prepare to leave your vessel; no baggage will be allowed in the lifeboat.

ANSWERS TO THE ABOVE SIGNALS.

By day.—A man will stand on the most conspicuous part of the vessel, and wave his hat three times over his head.

By night.—A light will be shown over the side of the vessel where best seen.

Seasons.—The summer at the Cape is from October to April, and in this season it is thought safe for ships to lie in Table bay; but NW. gales are experienced here in every season of the year. In November, 1799, several large ships were wrecked during a severe NW. gale, and vessels have also been driven on shore in April; but as a rule these storms do not blow home in Table bay between November and May. The Dutch fixed on the 10th of May as the period for vessels to leave the bay as strong NW. winds might then be daily expected.

A heavy sea is thrown into Table bay by some of these NW. gales, and before the breakwater and docks were built there was not the slightest shelter, and even now vessels coming here in the winter months should be furnished with good ground tackle, as many vessels with their crews have suffered, more particularly in June and July.

In the fair weather season, regular sea breezes from SW. and west prevail in the mornings, and continue until noon or even longer; these are succeeded by SE. winds from the land, which frequently blow fresh.

Winds.—During summer (October to April) the prevailing winds in Table bay and near the cape of Good Hope, are from the SE.; these, although known by the name of southeasters, blow at about SSE. frequently with violence during the summer season, and more or less in every season of the year, generally bringing settled weather.

When Table mountain, in the summer months, begins to be covered with a white cloud, it indicates a strong southeaster. In January, February, and March these winds blow at times with great fury over Table and Devil mountains, and through the gap between them, driving the white clouds in rolling fleeces like wool over the perpendicular sides of the mountain. On these occasions vessels not well moored are liable to drive, and bring both anchors ahead. There have been instances of vessels driven from Table bay by these southeasters with all their anchors down, and not regaining the anchorage for five or six days. When Table mountain is free from clouds the southeaster will be moderate, and prevails on the eastern side of the bay only, while a gentle breeze from seaward blows in on the western side. Sometimes there occurs a fall of the barometer while such a gale is blowing, when a change of wind to north may be expected; if this does not come, a black southeaster follows. Sometimes a black southeaster follows a sudden change of wind from the north.

The so-called "black southeaster" is distinguished from the regular

southeaster by the nimbus, or rain tint, of the cloud on Table mountain; it is frequently accompanied by light rain and cold weather. Black southeasters are very destructive to the vines and to young vegetation, their appearance the next day being as if withered by frost.

During winter (May to September) northwesterly winds prevail. Westerly and SW. winds blow strong, and are often accompanied with fogs and cloudy weather, and with the SW. wind hailstorms are frequent; but the NW. winds are most violent in those months, often blowing in severe storms from north or NNW. for several days, with a cloudy sky, and sometimes accompanied with rain. NE. winds are less frequent than any other and never continue long.

In calm weather low fogs occasionally occur, particularly in winter and autumn, the tops of the mountains and high hills being visible above the fog, which is afterwards dispersed by the heat of the sun.

The coast.—The distance from Green point to the southern extremity of the cape of Good Hope is about 32 miles, measured by the salient points, the intervening coast line being rugged and indented, while the outline of the country is also broken and irregular. From Green point to Duyker point the distance is about 9¾ miles in a SW. by S. direction, and along this portion of the coast the water is deep a mile off shore, but within that distance there are numerous offlying rocks and patches of rocky reef. Vessels navigating in this locality should maintain an offing of 2 or 3 miles, for inside these limits the wind is generally light and baffling, from the close proximity of the highland.

From the western end of Table mountain a high serrated ridge of mountains, called the Twelve Apostles, extends in a SW. by S. direction, toward Hout bay. They present a steep precipitous face to seaward, and are terminated by a remarkable conical hill, similar in appearance to the Lions head, though not so high, and having at its southern slope a very conspicuous white sand patch. To the southward of this, about 1½ miles distant, rises a lofty rugged hill called Suther peak, which is divided by a saddle ridge from Captain peak, a remarkable hill of considerably less elevation, overhanging, and to the westward of Hout bay.

Lions paws.—Between 2½ and 3 miles SW. by S. of Green point lighthouse, and just to the northward of Camps bay are two clusters of rocks, 800 yards apart, known as the North and South Lions paws; these rocks are awash, but with 7 and 9 fathoms close to, and they lie ½ and ⅓ mile off shore, the Lions head bearing S. 77° E. (S. 47° E. mag.) and N. 80° E. (S. 70° E. mag.) from them respectively. Robben Island lighthouse N. 12° E. (N. 42° E. mag.), will lead about a mile to the westward of the outer danger; and Green Point lighthouse bearing N. 60° E. (east mag.) leads ½ mile northward of the paws. Besides the Lions paws there are several other straggling rocks along shore, which is generally foul.

Duyker point, is rocky, forming the western extremity of the Cape peninsula, and as there are some outlying rocks off it, the point should be rounded with caution and not within the distance of a mile. There is no bottom with 40 fathoms, 1½ miles off shore, and Green Point light bearing N. 40° E. (N. 70° E. mag.), clears the point about that distance. Half a mile to the northward of Duyker point, there is a dry ledge of rocks, which extends fully ⅓ mile off shore.

Vulcan rock.—This rock, which is the central and highest of a cluster about 150 yards in extent, is awash at high water, and has from 11 to 20 fathoms from 200 to 400 yards distant all round. It lies nearly ¾ mile off shore, with Duyker point north (N. 30° E. mag.), and the rounded rocky bluff, forming the north point of Hout bay, N. 85° E. (S. 65° E. mag.). Between Vulcan rock and the shore the ground is foul, a line of breakers extending from Duyker island, a low flat rock close to the shore, to a mid-channel position. Vessels should pass outside Vulcan rock.

Hout bay.—From Duyker point to Slang Kop point, the distance is 7 miles in a southerly direction, and between these points the land falls back to the eastward, forming Hout and Chapman bays. Hout bay is formed by a deep indentation in the high coast line, and may be said to consist of an outer bay, open to the southwestward, containing a square mile of anchorage of from 20 to 6 fathoms; and an inner bay, open to the southward, half a square mile in extent, with depths gradually decreasing from 7 to 3 fathoms.

On the western side of the inner bay is York point and battery, and on the opposite side nearly ¾ mile distant is Blockhouse point. It is advisable to anchor as close in, round York point, as the vessel's draft admits. With an inside berth a vessel may lie safely in all weather, and this port, which is capable of affording shelter to 6 or 8 vessels of ordinary size in all winds, if properly moored, is on the whole a better harbor than would appear at first sight. Vessels at anchor farther out are exposed to the swell, but are still sheltered from all quarters except the SW., which wind is said not to blow home against the high land.

The coast on either side of the entrance is high and rugged, particularly on the eastern side, which is quite inaccessible. Here the hills rising precipitously from the coast, are broken by a succession of ravines, which renders walking around the shore impracticable. There is no landing on this side.

York point is overlooked by Captain peak, a sharp rugged hill, with a perpendicular face on its southern side, and connected by a saddle ridge with the higher land to the northward known as Suther peak.

The northern shore, forming the head of the bay, is low and marshy, with a stream of fresh water running into the bay. The landing is on the west side of the bay within York point, and is tolerably good, even during

SW. gales. A moderate outlay would furnish good landing jetties, and sheltered spots for the repair of shipping.

The summit of a remarkable peak, Constantiaberg, 3,200 feet high, seen over the high cliffs on the eastern side of the bay bearing N. 66° E. (S. 84° E. mag.), leads directly into the bay. A line of foam, giving a false appearance of danger, is frequently seen across the entrance. This port is scarcely ever visited by ships, and yet it possesses advantages as a place of shelter, especially for steamers. The only objection to it for sailing vessels, is one that is applicable to all harbors surrounded by highland, namely, variable winds and strong gusts from the shore.

Dangers.—The only outlying dangers in the approaches to Hout bay are: Vulcan rock before mentioned; some sunken rocks extending about 200 yards southward of York point; and a sunken reef which runs out from Chapman point SW. by W. about ⅓ mile. These dangers can scarcely be deemed to obstruct navigation, as common prudence would keep a vessel beyond their limits.

Supplies.—Fresh water is abundant at Hout bay, but at present there are no conveniences for getting it on board. Provisions may easily be obtained from Cape Town, and fish of good quality is abundant.

Tides.—It is high water, full and change, in Hout bay at 2h. 20m.; springs rise 5 feet.

Slang Kop point.—Above Chapman point, which is common to Hout and Chapman bays, is Chapman peak, of dark appearance and considerable elevation. From Chapman point to Slang Kop point the distance is about 3½ miles in a SSW. direction; the intervening shore falling back into the curved sandy beach forming Chapman bay, which is fringed with rocks, and being exposed to northwesterly winds, should not on any account be used as an anchorage.

Immediately at the back of Slang Kop point the cliffs rise to the height of 300 or 400 feet above the sea; but the point itself is low and rocky, with a ledge of sunken reefs fringing the shore, at the distance of one mile. The sea breaks over this rocky ledge only in westerly winds, when there is usually a heavy swell. From Slang Kop point to the Kromme river, a distance of 5½ miles, in a southeasterly direction, the coast becomes higher and rugged; thence to Olifants Bosh point and the cape of Good Hope it is elevated from 300 to 400 feet above the sea, and is tolerably regular in outline.

Olifants Bosh point.—A sunken danger having been reported 3 miles from the shore, in the neighborhood of Olifants Bosh point, situated about 7 miles NW. of the cape, on which danger it was stated the Union Mail steamer *Kafir* struck, on her passage from Table bay to cape of Good Hope; a close examination of this locality was made and no indication of

sunken rock farther from the coast than 1,200 yards could be found in the neighborhood of Olifants Bosh point.

Albatross rock, on which the *Kafir* probably struck, was found to have less than 6 feet water, with 7 to 13 fathoms around and 5 fathoms between it and Olifants Bosh point; its outer part bears S. 70° W. (west mag.) from Olifants Bosh point, distant 1,200 yards.

One mile westward of Albatross rock the soundings increase to 27 and 30 fathoms, and nearly the same depths are found at the distance of 2¼ miles in the same direction.

North from Albatross rock, distant 1$\frac{1}{10}$ miles, and nearly 800 yards from the shore, a detached rocky patch of small extent, with less than 6 feet water on it, also exists.

Caution.—Cape of Good Hope light is obscured by intervening land between the bearings S. 55° E. (S. 25° E. mag.) and S. 61° E. (S. 31° E. mag.). The latter bearing leads one mile SW. of Albatross rock.

It is recommended, in proceeding northward, to keep the light in sight until Duyker point is open of Slang Kop point.

Rocky bank.—Heavy breakers, during bad weather, having been reported in a northwesterly direction from the cape light, the locality has been examined with the following results:

The breakers were found to be on a rocky ledge, about 1¼ miles long north and south, and from one to 1¾ miles from the shore, having 10 fathoms on its shoalest part, with soundings gradually increasing to 20 fathoms on its outer edge, and with 18 fathoms between the ledge and the coast.

From the shoalest part of the bank the cape of Good Hope lighthouse bears S. 71° E. (S. 41° E. mag.) 6 miles.

This rocky bank lies somewhat in the fairway for vessels passing round the coast to and from Table bay, and, as in heavy southerly gales a continuous line of breakers has been observed to extend between this ledge and the shore, vessels should not approach this part of the coast in bad weather.

Cape of Good Hope.—The southern extremity of the Cape peninsula is a high precipitous cliff, surmounted by two peaks distant from each other 1,800 yards N. 58° W. (N. 28° W. mag.) and S. 58° E. (S. 28° E. mag.). The one to the NW., 880 feet high, is known as Vasco de Gama peak; and on the other, 800 feet high, near the pitch of the Cape, stands the lighthouse.

Light.—The lighthouse on Cape point, the southernmost extremity of the Cape peninsula, is of iron, 30 feet high, and painted white; it exhibits a revolving white light, showing a bright face for the space of 12 seconds every minute. It is visible all round the compass from seaward, except between the bearings of S. 8° E. (S. 22° W. mag.) and S. 36° E. (S. 6°

E. mag.), and between S. 55° E. (S. 25° E. mag.) and S. 61° E. (S. 31° E. mag.), on which latter arc of 6° it is obscured by the intervention of Vasco de Gama peak, rising 64 feet above the light. The light is elevated 816 feet above the mean level of the sea, and in clear weather should be seen from the distance of about 36 miles.

Caution.—Great care is necessary when approaching this light, as from its great elevation it is frequently obscured by mist, although at the same time clear round the horizon.

A Signal station has been established on Cape point close to the lighthouse; and passing vessels, showing their number, will be duly reported.

Southwest reefs, which are generally breaking, appear to be the outer projections of a rocky ledge, extending in a SW. by W. direction one mile from cape Maclear, the SW. extreme of the cape of Good Hope. From the 5-fathom patches, the lighthouse on Cape point bears N. 57° E. (N. 87° E. mag.) $1\frac{3}{4}$ miles. Under no circumstances should vessels attempt to pass inside this danger, and coming from the northward they must not shut in Slang Kop point until the extreme of Cape point bears N. 49° E. (N. 79° E. mag.).

Bellows rock, from which the lighthouse on Cape point bears north (N. 30° E. mag.) $2\frac{1}{6}$ miles, is awash at high water, and always breaks. The water is deep close round this rock except on its SW. side, where there are sunken rocks about 200 yards distant, on which the sea does not always break.

Anvil rock.—This danger has only 6 feet on it at low water springs, and lies on the eastern end of a rocky patch, about 400 yards in length, ENE. and WSW., having a depth of 3 fathoms over it. Breakers only show upon these rocks at low water with a heavy swell, and the soundings are from 14 to 18 fathoms close outside them; much care is therefore requisite when approaching their vicinity. From the Anvil rock, Devils peak (Table bay) appears just open east of Muizenberg, a mountain 1,651 feet high, which rises near the shore at the NW. corner of False bay; the Bellows rock bears S. 50° W. (S. 80° W. mag.) about $1\frac{3}{4}$ miles; and the lighthouse on Cape point N. 55° W. (N. 25° W. mag.) $1\frac{2}{3}$ miles; the passage between Dias and Anvil rock is a little over a mile wide.

Dias rock, of small extent and about 8 feet high, is detached from the south extremety of the cliff projecting from the lighthouse on Cape point, but it is connected with the point by sunken rocks.

Three pinnacle rocks with $4\frac{1}{2}$ to 5 fathoms on them lie between Dias rock and the Anvil rock, rendering the passage between them unavailable.

Directions.—Making the Cape from the Westward.—Vessels approaching the cape of Good Hope from the westward will, if the weather be clear, make Cape Point light at the distance of about 36 miles, unless it should happen to bear between S. 55° E. (S. 25° E. mag.) and S. 61° E.

(S. 31° E. mag.), in which case it is invisible through an arc of the horizon of 6° being intercepted by Vasco de Gama peak. Caution is therefore necessary not to continue a course between these bearings when making the land at night, or in hazy weather, but to steer so as to cross the darkened region with as little delay as possible. By using this precaution, there is little danger to apprehend from the light not being visible on this small sector of space.

Should a vessel be near the coast at night, and the land not visible, she should be kept to the southward and westward until her position is ascertained.

As the wind seldom, if ever, blows from the east or NE (*i. e.*, directly off the peninsula), sailing vessels bound either for Table bay or round the cape of Good Hope, should ensure a weatherly position to the north or south, according to the season of the year. Those for Simons bay have been detained many days by southeasters off the Lions head and Hout bay, in consequence of their making the land too far to the northward during the summer season. The same winds would have been fair for them had they been 30 miles farther south. On the other hand a vessel bound for Table bay in the winter season will find it difficult to make her port from a position off Cape point, during a continuance of north and NW. winds, notwithstanding the general prevalence of a NNW. current.

Rounding the Cape from the westward.—Vessels rounding the cape from the westward and proceeding into False bay, should pass about ½ mile southward of Bellows rock, which is always visible by the breakers, thence steer N. 70° (E. mag.) until Constantiaberg is well in sight, bearing N. 22° W. (N. 8° E. mag.), or Vasco de Gama peak opens eastward of the lighthouse hill, either of which marks lead eastward of Anvil rock. (See page 545 for continuation into False bay.)

If proceeding to the eastward, having passed the cape at a prudent distance, careful bearings of the cape light should be taken as long as it is in sight, so as to avoid the dangerous neighborhood of Birkenhead rock. Cape Agulhas light is not visible when bearing southward of S. 86° E. (S. 56° E. mag.).

Beaching.—There is a small sandy cove between the lighthouse and cape Maclear, in which vessels in a sinking state may be beached in greater safety than on any other part of the adjacent seacoast.

Clearing mark.—To avoid Southwest reef, when nearing cape Maclear, do not bring Bellows rock to bear southward of S. 69° E. (S. 39° E. mag.), until Dias rock bears N. 52° E. (N. 82° E. mag.), or until cape Maclear is midway between Vasco de Gama peak and a gap which separates the lighthouse from that peak.

Rounding the Cape from the eastward.—When Cape Point light is in sight, vessels in standing in toward the land, should be guided by

frequent bearings; at the greatest range of the light its bearings will give an idea of the vessel's position with reference to Danger point, which with the rocks off it should be carefully avoided, but when to the westward of Danger point, the light should not be brought to bear more westward than N. 78° W. (N. 48° W. mag.), which will clear all danger off Mudge point and cape Hangklip. As cape Hangklip, and the narrow neck of land which connects it to the shore, is very low, great caution is necessary in passing it in hazy weather, especially if bound into Simons bay.

If bound for Table bay from the eastward, vessels, after rounding the cape of Good Hope and passing Slang Kop point, should not shut in Cape point light with that point, until Robben Island light bears N. 21° E. (N. 51° E. mag.), or the light on Green point becomes visible, which will be on an N. 40° E. (N. 70° E. mag.) bearing.* This latter bearing leads about 3 miles westward of Vulcan rock (see directions at pages 528 and 529). The precaution of using the lead when approaching cape of Good Hope should never be omitted.

False bay.—The entrance to this bay is formed between the cape of Good Hope on the west and cape Hangklip on the east, the distance being 16 miles. Within this line the bay, which is square in form, extends to the northward about 18 miles. There are several dangers in the bay, but the middle and eastern sides are considered clear, though the bottom is foul and generally unfit for anchorage. Notwithstanding this, a vessel in False bay with foggy weather and light winds may bring up with a stream anchor and cable. The general depth varies from 46 fathoms at its entrance to 20 fathoms about 5 miles from its head, whence it gradually shoals to the breakers, which break in from 4 to 5 fathoms about ½ mile off the beach. At the entrance of the bay there is a rocky bank, on which the least water is 13 fathoms, and its NW. end is S. 56° E. (S. 26° E. mag.), distant 5 miles from Cape Point lighthouse.

Whittle rock, with only 7 feet water, appears to be about 6 feet in diameter. It rises on the south side of an extensive rocky patch nearly a mile in circumference, upon which the depths vary from 7 to 10 fathoms. It lies with Cape Point lighthouse bearing S. 30° W. (S. 60° W. mag.), distant about 7¼ miles, and the lighthouse on the Roman rocks N. 53° W. (N. 23° W. mag.) 6½ miles. It seldom breaks, and then only with a heavy sea and at low water.

Beacons.—A beacon, 35 feet high, and 56 feet above high water, painted white with a red band in the center stands on a flat-topped rock, a few yards from the shore near Oatland point, and 1,700 yards from an inner white beacon, with staff and ball, on the shoulder of the hill beneath

*The South Whittle beacon (black, with staff and ball) situated on a lower hill about 3 miles northward of Cape lighthouse is often visible when the lighthouse is enveloped in mist, and is a good mark for recognizing the locality.

Simons berg. From the Whittle rock, these two beacons, as well as a large whitewashed patch on the hill NW. of Simons town, are in line N. 64° W. (N. 34° W. mag.); as are also the black and white beacons, each with staff and ball, standing on the land over Buffals bay bearing S. 52° W. (S. 82° W. mag.); consequently if these respective beacons are kept open of one another the Whittle rock will be cleared.

Clearing marks.—Chapman peak, well open to the westward of Elsey peak, N. 44° W. (N. 14° W. mag.) leads 800 yards westward of the Whittle; and Roman Rocks lighthouse, in line with Elsey peak N. 33° W. (N. 3° W. mag.) leads midway between Whittle rock and Miller point.

Buffals bay, on the western shore of False bay, and 2 miles northward of Cape point, is a small indentation in the coast line, marked by a white sand patch. On the ridge of hills behind the bay is a black beacon which shows out clearly as a mark for the Whittle rock. A white beacon for the same purpose also stands near the sea, just to the northward of the bay. The depth of water is 4 or 5 fathoms near the shore, and in a NW. breeze a vessel may anchor off it in 8 to 20 fathoms, if unable to beat to windward; this is preferable to going to sea. There is a fishing establishment and a landing place in the bay.

Temporary anchorage may be found in 26 fathoms, sandy bottom, with Cape point S. 13° E. (S. 17° W. mag.) and the black beacon S. 80° W. (N. 70° W. mag.), distant from the shore one mile. Here the water will be smooth in a northwester, and if a southeaster comes on a vessel will have room to weigh, cast, and run up to Simons bay.

Between Buffals bay and Smithwinkle bay, 3¼ miles further north, the shore is overlooked by four sharp peaks. Off both points of Smithwinkle bay, rocks, some of which are above water, project ⅓ mile from the shore, and outside Batsata rock, which is 8 feet high, and the highest and outer of those off the southern point, is a patch with 2 fathoms. Vessels must not approach nearer to this point than ¾ mile.

Rockland point is about 7½ miles N. by W. of Cape point, and 3 miles S. by E. ½ E. of Roman Rock lighthouse. It is the most prominent point, and at the foot of the highest land, between Cape point and Simons bay.

The point runs off to a ledge of dry rocks, beyond which there is an isolated rock named Bakkoven, lying 400 yards to the southeastward. This rock, which is about 9 feet above high water, has 11 fathoms close outside it. Castle rock, lying 600 yards southward of Bakkoven, dries only at low water.

From Smithwinkle bay to Rockland point the coast is lofty, the hills rising to a height of 2,200 feet almost abruptly from the sea. Farther to the northward the hills recede a little from the sea.

Northward of Rockland point, and distant from it 1½ miles, is Oatland point, with a few rocks off it, on one of which is the white and red Whit-

tle beacon. Between these points sunken rocks extend from ¼ to ½ mile off.

Noahs ark is a flat-topped rock, in shape resembling a barn, about 100 feet long by 30 feet high, lying 600 yards off shore, about a mile northward of Oatland point. The water is deep close round it, save on the NE. side, where, at 30 yards off, there are 2½ fathoms. There is a passage inside Noahs ark, but it should on no account be attempted.

Phœnix rock.—For a distance of 700 yards in a NW. by W. direction from Noahs ark, the ground is shallow and foul, having on it Nimrod rock, with only 8 feet water, and terminating with Phœnix rock, which has but 3 feet over it. This latter danger is marked by a red buoy with staff, and the word "Rock" painted on its flag, lying N. 53° W. (N. 23° W. mag.) 100 yards from it.

Maidstone rock, with 22 feet on it at low water springs, lies S. 81° E. (S. 51° E. mag.) 400 yards from the SW. end of Noahs ark, and about 700 yards from the nearest shore. The base of this rock is about 20 feet in diameter, rising to a sharp peak, the summit of which is so small that it is difficult to keep the lead on it.

The marks for it are the SW. end of Noahs ark on with the north corner of Mount Curtis garden wall, N. 81° W. (N. 51° W. mag.), and the Roman rocks a sail's breadth open of the foot of Muizenberg, or Castor beacon in line with the shoulder of Muizenberg.

There is also a small patch of 29 feet, which is steep-to on all sides, lying 200 yards S. 58° E. (S. 28° E. mag.) of the Maidstone rock.

Roman rocks are a cluster occupying a space of about 150 yards across, one of the rocks being above water, the rest awash, and the whole surrounded by foul rocky ground.

Light.—The lighthouse on the Roman rocks exhibits, at 54 feet above high water, a revolving white light, which shows a bright face for 12 seconds every half minute, and should be visible in clear weather from a distance of 12 miles. The light tower, which is on the southern and highest rock, is circular, of iron, 48 feet high, and painted in broad horizontal bands of red and white.

Castor rock is detached from the Roman Rocks cluster, and lies north (N. 30° E. mag.) 400 yards from the light tower. It has 15 feet water on it, and its position is marked by a red buoy with staff, and the word "Rock" painted on its flag, moored 67 yards N. 15° E. (N. 45° E. mag.) of the rock. Between the rock and the lighthouse there are patches of 19 and 24 feet.

Seal Island is a low rocky islet 400 yards long and 200 yards wide. It lies N. 66° E. (S. 84° E. mag.) 6¾ miles from the Roman Rocks lighthouse, and is surrounded by sunken rocks, upon which the sea usually

breaks. Landing is difficult except in very smooth water. It abounds in guano, and is the resort of penguins, whose eggs may be collected in considerable numbers at the proper season.

York shoal, the nearest part of which lies S. 33° E. (S. 3° E. mag.) one mile from Seal island, is a rocky patch with from one to 4½ fathoms on it, and is about 800 yards long and 300 yards wide. The sea is generally breaking on the shoalest part.

East shoal is a rocky patch with from 4 to 8 fathoms over it, excepting in one small spot near the middle, that nearly dries at low water springs, and on which the sea is always breaking. The shoal is about ½ mile long, and ¼ mile broad. From the shoal spot, Seal island bears N. 81° W. (N. 51° W. mag.) 3¼ miles.

Abreast of Gordons bay, in the NE. corner of False bay, is another shoal patch, about ⅓ mile in diameter; with from 6¼ to 9 fathoms, and on which the sea breaks in heavy gales. The shoalest part lies 3¼ miles off shore, and N. 86° E. (S. 64° E. mag.) nearly 6 miles from East shoal.

Simons bay, situated about 11 miles northward of Cape point and near the NW. corner of False bay, is accessible all the year round, and affords complete shelter, for with heavy southeasters, the only winds that cause any inconvenience, vessels ride safely; and, though the bay is open to the east and NE., these winds never blow strong, so that it is a safe retreat for vessels at all seasons. The shores of the bay may be approached all round to within 400 yards, and the closer a vessel lies to the patent slip and hospital, the more sheltered she will be in SE. winds; but in bringing up, care is required not to foul the several pairs of moorings laid down for men-of-war. If, therefore, it is purposed taking an inshore berth, it is better to bring up on the SE. side of the bay, well under Blockhouse point, on which stands a fort and round white tower, ⅓ mile from the sea.

The Dock yard, though small, is a complete establishment, and has all the necessaries required for refitting and provisioning men-of-war. Seven sets of government moorings are laid down in depths varying from 25 to 52 feet of water.

There is a government patent slip, which at spring tides is capable of taking up ships of 1,000 tons, that can be lightened to a draft of 14 feet.

Simons bay is in telegraph communication with Cape Town, thence to Paarl, Stellenbosch, and Wellington. A railway connects Cape Town with Kalk bay, distant 6 miles by road from Simons town. The mail steamers do not touch here.

Position.—The dockyard is in latitude 34° 11′ 32″ S., longitude 18° 25′ 52″ E.

Wharf rock, having 9 feet of water over it, lies 2,507 yards N. 70° E. (east mag.) of the entrance to the Dockyard boat camber; and is marked by a beacon with the word "Rock" on it.

Supplies.—The water in Simons bay is excellent. For men-of-war it is brought alongside in a tank vessel, containing about 70 tons. There is a smaller tank vessel for merchant ships containing about 5 tons, but the dockyard tank is frequently lent to water merchant ships on application. Coal is plentiful and is sent off in bags in lighters at the rate of 250 tons per day. At times coaling is interrupted by gales. Labor is plentiful.

Supplies of all kinds, if in excess of what Simons town can supply, are obtained from the interior and from Cape Town, distant by road about 20 miles. Fish are abundant in the bay, and the beaches are good for hauling the seine.

Caution.—There is a fish in Simons bay, commonly called toadfish, about six inches long; back dark, with deep black stripes; belly white, with faint yellow patches; it swims near the surface, and is a constant attendant on lines employed in fishing. When taken from the water it puffs out considerably. Should any portion of the fish be eaten, death ensues in a few minutes.

Anchorage.—A good berth for a large ship in Simons bay is about ½ mile off shore, in 9½ to 10 fathoms, with Noahs ark S. 66° E. (S. 36° E. mag.), and the Dockyard clock S. 43° W. (S. 73° W. mag.). Vessels moor in this road NW. and SE. with the stoutest ground tackle to the NW. from May to September, for this being the winter season, the winds prevail from that quarter, and often blow in strong gusts over the hills. From September to May, the SE. and south winds may be expected to predominate; then the best bower should lie to the SE.

Time signal.—A circular disc attached to a lever arm working on a mast, has been established close to Simons Town telegraph office. The disc is raised to a right angle with mast at 5 minutes before signal, and falls (by electricity from the Cape observatory) at moment of 1h. 30m. p. m. Cape mean time, corresponding to Greenwich mean noon. When signal fails in accuracy the disc is kept up till 2 o'clock, then lowered.

Compass deviation.—Iron and other vessels desirous of testing their compasses, to ascertain the local attraction, will find it convenient to use Sharp peak, a conspicuous mountain to the NE. of Hangklip berg, which rises over cape Hangklip. The true bearing of this peak from the anchorage is S. 71° 1′ E.; and as the peak is 24 miles distant, the bearing will not be materially affected by the change of position of the vessel in any part of the anchorage in Simons bay.

Tides.—It is high water, full and change, in Simons bay at 2h. 44m.; springs rise 5¼ feet, neaps 3¾ feet. There is but little current perceptible in the bay at any time.

Winds.—From October to April, southeasterly winds generally prevail, but do not continue longer than five or eight days at a time, and are suc-

ceeded by variable winds. In Simons bay as in False bay, it frequently happens that these winds, after blowing very hard for a day and part of the night, abate toward morning, and are succeeded by a land breeze from the WNW. By taking advantage of this, and weighing with the first of the breeze, a vessel may sometimes get to sea before the return of the southeasterly wind. If unable to accomplish this, the most prudent plan will be to return to the anchorage in Simons bay.

In the SE. season these winds blow frequently and with violence at SE. by E., making landing in boats disagreeable and at times almost impracticable without sail, when very low canvas is recommended. It is often found that when blowing hard from the SE. in False bay, there is a gentle breeze from the NW. in Table bay.

From May to October northwesterly winds are most prevalent, with frequent gales and rain from that quarter. These gales occur at times all the year round, but they are rare in the SE. season. The wind scarcely ever blows from the NE., and never with violence. The SW. wind (commonly called the kloof wind) is cold and frequently rainy. During this wind no boats should sail in the bay on account of the violent and variable squalls which come down from the hills.

If the barometer stands at 30.2 to 30.3 and falls suddenly to 30.0 or 22.95, in nine cases out of ten it will blow a strong SSE. gale. The Muizenberg capped with white cloud is generally the precursor of a SE. wind; and if the Hottentot Holland range on the east side of False bay is also capped, the southeaster will probably be violent and of long continuance. When Simons berg has a misty cloud on its summit, rain may be expected within an hour or two.

North and East shores of False bay.—Northward of Simons bay the land ranges in height from 800 to 1,200 feet as far as Muizenberg mountain, which is 1,651 feet high. There are four remarkable sand patches on this coast—the first on NW. shore of Simons bay, the second between that and Elsey peak, the third in Elsey bay, and the fourth in Fishhook bay.

Kalk bay (pronounced *Cork*) is on the Cape Town and Simons Town railway. From a fishing station it has become a watering place, and now contains several hotels. The only good landing along this shore is at Kalk bay, where a projecting ledge of rocks makes a little shelter.

Eastward of Kalk bay the shore is a low sandy beach, with a continuous line of breakers fronting it and no landing; it is rarely approached by ships on account of the dangers in the northern part of the bay about Seal island.

The eastern shore of False bay to the southward of Gordons bay is bold, having no outlying dangers more than ¼ mile off it. The highland comes close down to the south side of Gordons bay, whence to Hangklip is an unbroken chain of mountains.

The Strand is a fishing station about 2½ miles north of Gordons bay. It has a boat harbor formed by a circle of sunken rocks extending some distance from shore. The entrance is narrow, but when inside it affords good shelter

Gordons bay is formed on the NE. side of False bay, and affords shelter from south and easterly winds. As it is quite exposed to westerly winds vessels can only lie there in the summer months.

It is doubtful if this bay could ever be made available as a port for landing cargo, there being a surf on the beach.

Kogel bay, lies about 5½ miles to the southward of Gordons bay; it is about 3 miles across and falls back to the eastward more than a mile; but the bottom in many parts being rocky it is not a good anchorage, although shelter may be obtained from south and easterly winds.

Pringle bay or cove is 3 miles northward of cape Hangklip, but being open to the westward, the same objections apply to it as to all the other bays on this side of False bay. It affords shelter in SE. gales, in depths of 9 to 10 fathoms.

Cape Hangklip.—The quoin-shaped hill of this name (sometimes called False cape), 1,448 feet high, is the eastern point of entrance to False bay, and makes as an island in approaching from the southward. Its western face appears to overhang from some points of view (hence its name), and a conspicuous sand patch extends half way up its SE. side.

The cape itself, about 1⅓ miles to the southward of this hill, is very low, and a heavy sea always breaks upon it; there is a sunken rock lying N. 66° W. (N. 36° W. mag.) ¾ mile from the cape, and ⅓ mile off the shore, and as the sea breaks some distance outside of this rock, it is not advisable to pass within a mile of the cape.

Inside Hangklip the land is low, then rises to a sharp peak 2,780 feet high, at the distance of 3½ miles from Hangklip hill. This peak is the commencement of a chain of mountains extending to the eastward.

Directions.—Steamers or sailing vessels with a fair wind, coming from the westward by day, and having opened the clearing marks for Anvil rock, (see page 538) should, if bound for Simons bay, steer N. 7° W. (N. 23° E. mag.) midway between Whittle rock and the shore; and when Elsey peak is in line with Roman Rocks lighthouse, bearing N. 33° W. (N. 3° W. mag.) steer for it, altering course when within a mile of the lighthouse, so as to pass midway between it and Noahs ark; and when the blockhouse on Blockhouse point bears S. 49° W. (S. 79° W. mag.), the vessel will be past the Nimrod and Phœnix rocks, and may haul into the bay, taking, however, sufficient sweep to have time to choose a berth and room for rounding-to.

Vessels westward of Whittle rock and nearing that danger will easily avoid it by keeping the beacons erected to show its position well open of

each other; or Chapman peak (a dark peak over the southern side of Hout bay) well open west of Elsey peak, N. 44° W. (N. 14° W. mag.). A line drawn from Oatland Point beacon to Roman Rocks lighthouse, N. 5° W. (N. 25° E. mag.), passes 200 yards eastward of the 29-foot patch, and nearly 400 yards eastward of Maidstone rock; vessels of heavy draft should not therefore pass within this line until the Admiral's house is open its breadth eastward of Noahs ark, bearing N. 86° W. (N. 56° W. mag.).

The ordinary channel for ships entering Simons bay is between Noahs ark and the Roman rocks, a width of 1,400 yards; but if the wind be NW., and the vessel under sail, the passage east and north of the Roman rocks should be taken, as it affords better working space. A vessel of large draft, however, when passing NE. of the lighthouse on the Roman rocks, should give it a berth of ¼ mile, to avoid the Castor rock.

The four sand patches on the hills northward of Simons bay, are usually conspicuous and serve as good landmarks for the bay; the western patch is a streak stretching down from the top of the hill.

In thick weather and uncertain of the position of the vessel, it is advisable to anchor when the soundings come under 20 fathoms.

If apprehensive of being near the Whittle rock in thick weather it may be of service to know that on its SE., south, and SW. sides at ½ mile distance, the soundings are 22 and 23 fathoms, large bits of whitish shell without any sand; the same bottom in 24 and 25 fathoms will be found in some other places in the vicinity of this rock, but in no other part of the bay is the bottom of a similar nature.

At night.—Caution is necessary in misty weather against the possibility of mistaking the light on the Roman rocks for the light on Cape point, as they are both revolving and only 10 miles apart. The distinction consists in the difference of interval of revolution, the light on Cape point showing its bright face every minute and the light on Roman rocks every half minute.

Care should be taken in rounding the cape of Good Hope for Simons bay to give it a berth of not less than 3 miles; the position of the vessel may from time to time be fixed by bearings and the distance run between them, or by the angle of elevation of the light. By not going into less than 45 fathoms until the Cape light bears northward of N. 13° W. (N. 17° E. mag.), a vessel will clear Bellows rock.

When eastward of Anvil rock, with Cape Point light bearing about N. 64° W. (N. 34° W. mag.), distant 3 miles,* steer N. 7° W. (N. 23° E. mag.) until Roman Rocks light bears N. 33° W. (N. 3° W. mag.); then steer for it to within ½ mile of the light, when alter course to N. 75° W. (N. 45° W. mag.) which should lead ¼ mile northward of Phœnix rock, and haul gradually into the anchorage.

*The Roman Rocks light may be seen from near this position, if not from the deck, from the masthead.

Unless thoroughly acquainted with the navigation, and favored with moonlight, vessels at night should always pass to the eastward and northward of Roman rocks. The four large sand patches on the hills northward of Simons bay are visible on bright nights, and in steering for Simons bay they will be ahead or on the starboard bow; bearing this in mind will prevent the Muizenberg being mistaken for the hills southward of Simons bay; these patches, with the exception of that over Buffals bay, are the only sand patches on the west side of False bay.

Passing eastward of Whittle rock.—Observe that Whittle rock is nearly in a straight line between Hangklip and Simons bay. Running for Simons bay do not bring the Cape light to the southward of S. 38° W. (S. 68° W. mag.) until the Roman Rock light is between the bearings of N. 58° W. (N. 28° W. mag.) and S. 88° W. (N. 62° W. mag.), between which bearings a vessel will be clear of the Whittle on the one hand and the York shoal on the other. If working in, make short tacks between the above bearings of the Roman Rock light, until certain of being within 5 miles of it.

By day, Chapman peak touching the western edge of the sand in Fish-hook bay, leads ⅞ mile eastward of Whittle rock. The whitewashed mark, on the hill over Simons bay, kept one quarter of a point open to the eastward of the beacons, also leads eastward of Whittle rock.

Running for Simons bay in a southeaster.—It is not advisable for a vessel in a strong southeaster to run for Simons bay at night, for the gusts of wind are violent, and there is a risk in bringing up; but should stand off and on the Cape under easy sail till daylight.

It has been recommended when entering Simons bay in a heavy southeaster, that vessels should pass outside the Roman rocks, so as to have more room for rounding-to; but as by doing so the last mile must be passed with the wind abeam, there will be a risk of sails or spars unless close reefed. It is perhaps better to come in between the Roman rocks and Noahs ark, shortening sail so as to have all furled when abreast of the latter, and to round to under the spanker only. The sheet cable should invariably be bent, and the anchor cleared away, when entering False bay in a southeaster.

The coast between cape Hangklip and Danger point, about 27 miles to to the southeastward, forms a bight 8 to 10 miles in depth; Mudge point lies about midway with Sandown bay to the westward, and Walker bay to the eastward. The remainder of the bay is composed of rocky projecting points. Palmiet river 9 miles eastward of cape Hangklip, is a rapid stream in winter, but its entrance is always blocked. About ¾ miles eastward of the river is a small cove, where boats may land in fine weather.

Mudge point is low and rocky, and there are many sunken rocks off it, which, with the masses of kelp about them, form the south side of D'Urban

cove, where there is good landing in east and SE. winds. A coast range of hills terminates near Mudge point in Onrust berg, a square bluff 1575 feet high, which has a pile on it.

Walker bay is remarkable for the immense tracts of sands and high sand hills, which are visible a long distance off. About midway along the sand and one mile inland is a sand hill pyramid 427 feet above the sea. A long heavy swell always rolls into the bay, and the water is deep within one mile of the beach.

Klein river, in the northern bight of Walker bay, is a stream of considerable size, but its mouth is choked with sand.

Stanford cove, similar to D'Urban cove, affords landing in east and SE. winds. It is in the SE. part of Walker bay, 5 miles NE. of Danger point. There are several rocky patches off it, which with the heavy swell, renders it less available than Hydra bay. There are some fishermen's huts and plenty of good water near the cove.

Hydra bay, between Stanford cove and Danger point, is the best anchorage, as farther in Walker bay the swell is heavier. In approaching Hydra bay from the southward, the pitch of Danger point should not be approached nearer than 2 or 3 miles; the bluff hill of Mudge point may be steered for until the sand patch, which marks the face of the hillock over it, is well open, when the rocky spit projecting from Danger point will be cleared. Then haul up for the bay and anchor in 12 or 14 fathoms about ¾ mile from shore, taking care to keep the low extreme of Danger point, open of the intermediate points to avoid the 3-fathom rocky patch in the center of the bay and upon which the sea does not always break.

Tides.—It is high water, full and change, in this neighborhood, at 2h. 50m.; springs rise 5 feet. The rise of the tide and the establishment at Simons bay, Dyer island, and Struys bay are very nearly the same, and the stream of tide along the whole coast between cape Hangklip and Struys bay is inconsiderable and uncertain.

Danger point, the SW. extreme of Walker bay, is a tongue of low hummocky sand covered with bushes and stunted trees, projecting about 4½ miles from the base of Duin Fontein berg, which is 1,130 feet high, and a conspicuous, remarkable bluff hill from every point of view at sea. The depths are irregular off Danger point. If approaching it at night, do not go into less than 35 or 40 fathoms.

Birkenhead rock.—Several detached sunken rocks are met with off this part of the coast, the most dangerous of which lies about one mile from the pitch of Danger point, with 2 fathoms water, and from 10 to 18 fathoms within a short distance. There is a channel with irregular depths between Birkenhead rock and the reef stretching out from Danger point, but it is advisable to pass seaward of the rock. The sea breaks with vio-

lence on the rock, but often only at intervals of about a quarter of an hour.

Dyer island, 6½ miles southeastward of Danger point, is a low rocky islet, visible only a short distance. Geyser island is smaller, and lies just southward of Dyer island. These islands, together with the numerous rocks extending nearly 1½ miles westward from them, from a natural breakwater, under which vessels may find shelter in south and SE. gales. Landing is not good, and at times impracticable. The best is near a small staff and shed, the marks of a former sealing station.

Directions—Anchorage.—These islands, being low and white, are made out with difficulty when seen against the sand hills on the adjacent coast. In approaching them from the southward, keep Palmiet valley (near cape Hangklip) open of Danger point until Geyser island is in line with Gunners quoin to avoid the reef, which does not break in fine weather, extending westward from Dyer and Geyser islands; then haul up for Duin Fontein berg, and when Gunners quoin is open northward of Dyer island steer for it, and anchor in 10 to 12 fathoms, with the extremes of Dyer island bearing about S. 53° E. (S. 23° E. mag.) and S. 19° E. (S. 11° W. mag.), distant about one mile.

The bottom is sand, and the holding ground good, but the reef affords no shelter from SW. winds. There is a narrow channel, with depths of 3 fathoms, between the east end of Dyer island and the rock above water in shore, but it can not be recommended; the sea breaks across it in southerly winds. Foul ground, with heavy breakers, extends from Sandy point abreast to within one mile of Dyer island.

The coast from Danger point to Quoin point, a distance of nearly 19 miles southeastward, is low near the sea and backed by bare rugged hills of moderate elevation, one of which, False quoin, is 888 feet high, and about halfway between the points. A long heavy swell constantly breaks on the shore, which is inaccessible.

At about 5½ miles northeastward of Danger point at the head of a bay is the mouth of the Uilkraal, a small stream, checked at its junction with the sea by sand.

Patches.—About half way between Dyer island and Quoin point are two rocky patches, 1½ miles off shore, upon which the least water found was 4 fathoms. The sea breaks heavily upon them with any swell.

Gunners quoin (Buffel Jagt berg), 997 feet high, is a conspicuous bluff hill, named from its resemblance to a quoin, which however it does not bear when seen from the westward.

Quoin point is a square projection of hummocky land from the base of the Gunners quoin and is 3 miles from it. It is fronted by sunken rocks and heavy breakers to the distance of 1½ miles from shore, and is dis-

tinguished, when seen from the southward, by two sand hills near its extremity.

The coast from Quoin point to cape Agulhas, 18 miles to the eastward, is low and sandy, except abreast of a flat-topped range named Zoet Anys, where it is steep and rocky. The whole is exposed to the full force of the ocean swell, and landing is impracticable.

The depths are shallower along this part of the coast than they are off, and to the westward of the Quoin; and between 2 and 4 miles eastward of the SE. face of Quoin point, and 1¾ miles from shore are several rocky patches, some of which are above water.

There is tolerable shelter and smooth water, in strong NW. winds, under the lee of these reefs, and it is possible that a small vessel might find the same shelter close under the east extreme of Quoin point.

Cape Agulhas is a rocky projection at the most southern part of Africa. The features of the land about cape Agulhas distinguish it from the neighboring headlands. Viewed from a distance seaward, east or west, the north and south elevations resemble two oblong hummocks; at a distance from the southward the two appear united. The highest part is 455 feet above the sea, and is about one mile inland from the extreme of the cape.

Immediately eastward of the cape are two small indentations, the first of which is named St. Mungo bay. The whole of the coast about the cape and thence to Northumberland point consists of rugged sandstone and quartz rocks, or rocky reef, extending out about ⅓ mile, and perfectly impracticable for boats to approach. The sea breaks heavily all along this iron bound shore, particularly during southerly winds, and should a vessel touch here she is certain of destruction.

Wreck.—The steamer *Alcestis* lately struck on an obstruction off cape Agulhas and finally foundered. It is believed that the *Alcestis* struck on a wreck lying about 2¾ miles S. 63° W. (N. 87° W. mag.) of cape Agulhas. The steamer finally sunk in 17½ fathoms about 5½ miles N. 83° W. (N. 53° W. mag.) of the above position, or in about latitude 34° 50′ 30″ S., longitude 19° 51° E.

Light.—On the first undulation within the cape is the lighthouse which, at times, is somewhat difficult to distinguish from the southward against the higher land behind it. The lighthouse is a round tower 100 feet high, painted in red and white horizontal bands. The light is fixed white, 128 feet high, and visible between the bearings S. 86° E. (S. 56° E. mag.) and S. 60° W. (west mag.), and in clear weather should be seen for a distance of 18 miles. It is frequently invisible at this distance.

Northumberland point is low and sandy immediately on the beach, but a dangerous ledge of rocks surround the point, and shallow water extends in an easterly direction about one mile from the point. A detached rock which breaks at times lies east (S. 60° E. mag.), distant 1⅛ miles from the

point. Southwestward of the point the reef extends off about ⅓ mile, and the sea breaks heavily near it with SE. winds.

Bank.—A bank about one mile in extent, with from 7 to 9 fathoms water, lies with its north edge on the parallel and eastward of the lighthouse, and distant from it 5¼ miles. The sea breaks on it in bad weather.

Struys bay, between Northumberland and Struys points, affords shelter in west to NW. winds, but is wholly unsafe in any wind from WSW. round southerly to east.

Anchorage.—The anchorage is under Northumberland point, and vessels from the westward intending to anchor, may round the point in 10 fathoms water, at a distance of 2 miles, and when a stone house in the SW. part of the bay bears S. 82° W. (N. 68° W. mag.) haul into the bay, keeping the lighthouse to the northward of S. 77° W. (N. 73° W. mag.) until Northumberland point bears N. 72° W. (N. 42° W. mag.). Then steer N. 7° W. (N. 23° E. mag.), which should lead ½ mile clear of the outer rock off the point. Anchor in 5 fathoms sand with the stone house bearing S. 54° W. (S. 84° W. mag.) and the sandy extreme of Northumberland point S. 4° W. (S. 34° W. mag.). Large vessels are recommended to anchor further out in 7 fathoms.

Vessels from the eastward will clear the dangers of Struys point by keeping Agulhas light bearing well to the northward of S. 60° W. (west mag.).

Caution.—With strong winds from SW. through south to east, it is unsafe to venture into Struys bay, as the sea often breaks in 7 and 8 fathoms water. It has been the scene of many wrecks, and can not be recommended except as a temporary anchorage in west or NW. gales.

Landing.—The landing place is a small cove to the NW. of Northumberland point, sheltered by a shelf of shingle projecting from each extremity of the cove, but it is fast filling up with sand; a wooden jetty, at the end of which a vessel drawing 7 or 8 feet formerly secured, has been dry for several years.

Water.—There are several wells but the water is scarce and brackish; it is procured only by digging in the sand beach above high water mark.

Current.—During the examination of this part of the coast, in September, 1848, no current was observed in the bay, or within 2½ miles of the shore, but the fishermen state that a strong current frequently sets to the westward round Northumberland point. A vessel becalmed in the offing was seen from the anchorage drifting to the eastward more than one mile an hour. On two other occasions, close to the shore, about 2 miles westward of Cape Agulhas lighthouse, the stream ran through the whole night steadily to the WNW. at 1¼ knots per hour. These changes may probably be traced to the effects of the wind.

Several accounts concur in stating that eastward of cape Agulhas the

current has been found to set toward the shore; this indraught seems to be stronger between the months of January and April, and many wrecks that have occurred have been attributed to it.

Directions.—In standing toward any part of this coast, cape Agulhas light should not be lost sight of, and a vessel should stand off before the light disappears on a S. 86° E. (S. 56° E. mag.) bearing. From the westward, having passed Quoin point at a distance of 5 or 10 miles, a S. 81° E. (S. 51° E. mag.) course will round cape Agulhas at a similar distance. After rounding the cape, a vessel should keep the light in sight; it is advisable not to bring it to the westward of S. 71° W. (N. 79° W. mag.), on which bearing a vessel will pass the dangers extending from Struys point at a distance of 3 miles.

From the eastward, Agulhas light must not be depended upon for passing Struys point, as in hazy weather, or from other circumstances combined with the distance of Struys point (14 miles), the light may be faint or altogether obscured, and the vessel may get within the line of danger. Under such circumstances the point should not be approached at night to a less depth than 30 fathoms.

The same precautions are required in the day time, particularly in foggy weather; for the highland of Agulhas may be invisible, while the sand hills of Struys bay and the breakers off Northumberland point are distinctly seen. At such times it may be somewhat difficult to determine, whether the vessel is eastward or westward of Struys point, because the shore features of Struys bay are very similar to the bay eastward of Struys point, but in the former there is a white house, beacon, and flagstaff near Northumberland point; these, with the beacon on Struys point, should be sufficient to identify the coast.

While to the eastward of cape Agulhas, sailing vessels should not approach the shore nearer than 7 or 8 miles, at which distance the cape may be rounded, for if it falls calm the heavy swell which constantly rolls toward the shore will carry them with it, and the resource of anchoring would probably be of no avail, owing to the swell and the rocky nature of the bottom.

Vessels beating around cape Agulhas in strong northwesterly winds would find it safe and profitable to anchor in St. Sebastian, Marcus, or Struys bays, being prepared to weigh on shift of wind.

Caution.—In rounding cape Agulhas either way, be careful not to mistake the lights of camp fires for Agulhas light.

Agulhas bank.—The limits of this extensive bank, southward of cape Agulhas, have been fairly defined. The 100-fathom line appears to extend from near the shore in the vicinity of Bashee river to the southwestward, passing cape Recife at about 20 miles distant, and the meridian of Mossel bay at 60 miles; here it trends southward, reaching its outer limit

in latitude 36° 45′ S., longitude 20° 45′ E., thence it inclines northward, passing the Cape peninsula at a minimum distance of 5 miles. Nowhere does the edge of the bank appear to be very steep; the general soundings on it are from 45 to 80 fathoms.

Eastward of cape Agulhas the bottom is generally rocky, or coarse sand, shell, and small stones, while to the westward of Agulhas, mud or green sand will be found southward of latitude 35° 15′ S., but within 50 fathoms the bottom is rock, sand, or stones, and beyond 90 fathoms generally sandy, with black specks. The quality of the bottom is not, however, sufficiently ascertained to enable seamen to determine their position by it.

There is one marked effect of the Agulhas bank in quieting the heavy seas which roll up to it. A vessel may be exposed to a turbulent and irregular sea while in deep water and outside the bank, endangering spars and threatening to break over her, but the moment soundings of 60 to 70 fathoms are gained the sea becomes comparatively tranquil.

The Agulhas current is formed by two other currents coming from the Indian ocean, the principal of which, directed toward the south, descends the Mozambique channel along the coast of Africa, and the other, coming from the sea south of Madagascar, is the SW. branch of the Equatorial current of the Indian ocean.

These two currents unite northeastward of Natal in about latitude 28° 30′ S., longitude 35° E.; they form an enormous body of warm water, which runs to the SW. and westward, skirting the coast of Africa at from 3 to about 120 miles off and attaining considerable velocity between Port Natal and the meridian of about 23° E., at times running from 3 to 4½ miles an hour, its greatest strength being near the edge of the bank.

The current in its progress to the SW. becomes weaker and on reaching the Agulhas bank, does not, as a rule, run over the bank, but follows its contour or edge with a tendency to branch off, and in longitude about 22° E., the main body is deflected to the southward as far as the parallel of 40° S., whence a large part, being opposed by the northeasterly set from the Antarctic, recurves to the eastward, thus flowing back into the Indian ocean, but with diminished strength and temperature.

It has generally been considered that in the summer season (January–March) the Agulhas current attains its maximum strength and volume, and in the winter season (July–September) that it diminishes in force and extent, but from recent investigations it is considered that the current does not vary much in strength and direction throughout the year. The velocity of the current is said to be checked at times by westerly gales, and to run with increased strength afterwards, but it usually runs in the teeth of the gale, causing a dangerous high sea, especially near the SE. edge of the bank.

A small portion of the Agulhas current passes round and over the

southern part of Agulhas bank, and branching off to the NW., past the cape of Good Hope, is joined by the connecting current of the South Atlantic ocean, collectively forming a wide stream running northward along the coast, at the rate of one or 1½ miles an hour, with a tendency toward the coast at times, which must be guarded against. This warm water seldom reaches into Table bay, the water there being much colder than Simons bay. The sea temperature in the latter is from 62° to 64° in November; this warm water during long NW. gales is occasionally driven out and replaced by water from the south Atlantic, at a temperature of about 50°, with a counter easterly set. At such times the northern branch of the Agulhas is probably deflected to the southward with the main portion of the current.

The range of sea temperature near the land is greatest in January and February reaching 20°. In August, September, and October the range is less than 15°. The area in which the range amount to 15° is greatest in April. Off Natal the average temperature is 73°, and off the SE. edge of Agulhas bank 67°. In the neighborhood of 40° S., where the warm and cold currents meet, the 20° range of temperature exists throughout the year. It is rather larger in the winter and spring than in the summer and and autumn months.

Caution.—Although the southern edge of the Agulhas current has a tendency to set from the land, the northern edge on the contrary has a tendency to set toward the land, more especially to the westward of Algoa bay, where during and after SE., westerly, and northwesterly gales, the current is at times deflected from its general course and turned directly toward the land, causing a very dangerous element in the navigation of the SE. coast of Africa, if disregarded and not allowed for.

From this cause a large number of vessels have been wrecked, more especially between Algoa bay and cape Agulhas, and the necessity of guarding against these insidious dangers can not be too strongly impressed on those in charge of vessels proceeding along this coast.

Agulhas Counter current.—The remarkable recurving of the main body of the Agulhas current is due to the action of a polar, or cold water, current flowing from the SW.; the junction of the hot and cold waters of the two streams notably taking place off the Agulhas bank, giving rise to the confused sea, the irregular set of the currents, and by their effect on the atmosphere to those severe and fitful gales so well known to seamen rounding the cape of Good Hope. The meeting of these currents is frequently denoted by a broken, confused, and heaped-up sea, the warm current is also indicated by a marked change in the color of the water, which, combined with the agitation of the sea, frequently conveys the impression that the vessel is in soundings.

The large body of water deflected and turned to the eastward runs chiefly

between the parallels of 37° and 40° S., and though its strength is variable its average rate may be about 1½ miles an hour. It is rather stronger and more northerly in the summer than in the winter, owing probably in some degree to the melting of the ice in high southern latitudes, and to the smaller amount of westerly winds experienced to the northward of 40° S. in summer. It becomes more extensive than the Agulhas current, and to the eastward of the meridian of 28° E. it is traced northward to about latitude 36° S. A current of 3 miles an hour has been experienced in latitude 39° S.

Inshore Counter current.—Near the land, between capes Hangklip and Agulhas, the current occasionally sets in an easterly direction or dangerously toward the land at the rate of about one mile an hour; many vessels have been lost here by not allowing for this possible set and thus keeping a sufficient offing.

Between cape Agulhas and Kowie river (longitude 27° E.), an inshore current setting eastward at about the same rate is also frequently experienced in fine weather, and except off the mouths of the rivers, it follows the trend of the land, and is said to extend from one to 6 miles off shore.

Gales.—The severity of the gales off the cape district is well known to navigators, as also the rapidity with which they succeed one another, and their violence during the winter months.

The greatest number of gales are experienced between the SE. edge of the Agulhas bank and about 40° S., where the Agulhas current, deflected to the southward by the bank, meets the northeasterly drift from the Antarctic; here the struggle takes place between the warm and cold currents of the sea and the warm and cold currents of the air. On the SE. edge of the banks, in the months of June and July, about 30 per cent of the winds are recorded as gales.

The gales in this area are frequently circumscribed in their limits, and consequently the shifts of wind are sudden and violent, and may take place in any direction. The sea is, therefore, at times very heavy, particularly during SW. gales, and this area should, if possible, be carefully avoided.

It frequently happens that a gale, which is blowing in this area for a lengthened period, is either moderate or not felt near the shore.

Warning.—It has been found out that when, during summer, the barometer falls to 29.5, bad weather may be expected, and during winter that a fall to 29.75 will indicate a similar change.

A falling barometer when the wind is southerly, and the weather threatening, is a most useful warning in this part of the sea.

Westerly gales amount to about two-thirds of the whole number experienced, and are of two classes, NW. and SW. gales. NW. gales generally commence with a falling barometer, and sometimes their extreme

force is not felt until the wind is about west. SW. gales begin from the same quarter as NW. gales, the first fall of the barometer coming with a northerly wind shifting to NW.; the chief difference being that with SW. gale systems the NW. wind does not attain the force of a gale.

Northeast gales form about 6 per cent of the number experienced in the Cape region and are usually met within the eastern portion of the area (30° to 40° E.). They are generally short and of slight force, and frequently lose the force of a gale before the lowest barometer occurs. Lightning is sometimes seen at the same time. The chief danger in connection with them lies in the fact of their being generally followed by northwesterly, southwesterly to southerly, or even SE. winds, and that in many cases these winds attain the force of a heavy gale. Sometimes the second gale sets in with a sudden change of wind. Hence great precaution is necessary in watching the barometer, weather, sea, etc., during a NE. gale more especially when met with near the SE. coast of Africa.*

Southeast gales form about 10 per cent of all gales met with off the Cape and south coast. They are of two classes, namely, those preceded by northerly and northwesterly winds, and those preceded by southerly or SE. winds. Those preceded by northerly winds resemble SW. gales in their character, setting in after the lowest barometer has passed, and lightning often occurs before the wind changes from the northward and westward to the southeastward.

Those preceded by southerly winds are again subdivided, namely: (1) those fine weather gales generally met with near the cape of Good Hope, more especially during the summer months, and which are accompanied by a slight fall of the barometer; these are closely related to the southeasters common to Table bay (2). Those related to the SW. side of cyclonic wind systems, moving southward or southeastward. These are generally accompanied by bad weather, and are sometimes very severe; as these gales progress the wind often veers to the westward of south, the change generally taking place after the lowest barometer has been recorded. If necessary to heave-to in such a gale, the starboard tack should be preferred, as it is the coming up tack.

Exceptional gales form about 16 per cent of all gales met with off the Cape and south coast. These are gales which change quickly from one quarter to another, or for some other cause cannot be classed under those previously referred to. A very dangerous type of exceptional gale is one that changes quickly from NE. to NW. or SW.; it is frequently met with, but more especially near the SE. coast of Africa.

It is not possible to maneuver so as to avoid these, which shift suddenly from one quarter to another, so that when lightning and other weather

*Many vessels have been taken aback, and have foundered through neglecting these signs, particularly in the neighborhood of Algoa bay.

signs, or the direction of the swell indicate such a change, the chief precaution lies in reducing sail, especially on the main and mizzen masts. In gales which only shift from NE. to NW., and in which the barometer begins to rise as the wind goes to NW., and also in those which shift quickly from NE. through north to SW., the port tack should be preferred, if requisite to heave-to.

Icebergs are rarely fallen in with off the cape of Good Hope to the northward of 40° S., or it may be said of 43° S.; nevertheless, there are instances of icebergs being seen near the cape in April and in September, and it is therefore desirable to keep a good lookout for them at all seasons. From December to April icebergs are numerous near and southward of 45° S. Fogs are also prevalent south of that parallel. Icebergs are farthest north in the months of November to February, and therefore more liable to be met with; and least so in the months of June and July.

In approaching icebergs there may be a marked diminution in the temperature of the air and sea; the indications therefore of the thermometer should never be neglected, though it must not be assumed to be an infallible guide.

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* For Kabenda, where found, read Kabinda. (Also pages 274 and 397.)

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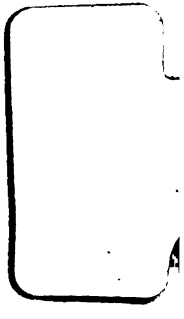
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